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THE VETERINARY JOURNAL

A MONTHLY REVIEW OF VETERINARY SCIENCE

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The Veterinary Journal.

JUNE, 1935.

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OUR COLLEAGUES AT THE ALFORT VETERINARY SCHOOL, PARIS

Seated (left to right):
Professeurs Lesbouyries, Robin, Maignon, Bressou (Directeur), Coquot, Henry, Letard.

Standing—Assistants (left to right)
Messieurs Brion, Valade, Mouvoisin, Prof. Panisset, M. Moussu, Prof. Simonnet, M. Goret, M. Berthelon

The New Hostel for the Students of the Alfort (Paris) Veterinary School, opened by the Minister of Agriculture, June 21st, 1935.

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JUNE, 1935.

Editorial

THE FORTHCOMING N.V.M.A. CONGRESS.

ANOTHER annual gathering is fast approaching, and the National Veterinary Medical Association Congress at Belfast, between July 29th and August 2nd, bids fair to at least equal those of other years in the warmth of its welcome and the excellence of the literary pabulum provided for the digestion of those who take part in the proceedings.

On another page our readers will find a complete programme, by which can be surmised something of the trouble which has been taken by the officials and those in authority in order to make it a success. Let us urge everybody who can to be present. Our French colleagues in Paris have also just held their similar Congress, which is biennial, and on this occasion they were honoured by the presence of the representative of the Minister of Agriculture to unveil and dedicate a bust of the late Professor Raillett, and at the same time to formally open the magnificent new hostel of 300 rooms for the residence of those students who live in. It is interesting to compare the programme, which we also print in full, with that of our own Association.

IRISH ANIMALS ALREADY BENEFIT BY THE NEW VETERINARY ACT.

ALREADY in the campaign against quackery the animals in Ireland are benefiting by the new Act which has recently been passed to protect them when sick and helpless against the ignorant (and often harmful) charlatan, who flourishes even yet, to our shame, in Great Britain. This Act prohibits an unqualified man

in the Free State not only from prescribing medicines, but also from performing operations on animals; and the undermentioned extract, taken from the *Cork Examiner* (June 17th, 1935), gives in a few lines the details of the case.

Broke Veterinary Rules.

" A fine of £1, with £2 expenses, was imposed at Rathdowney on Francis J. Whelan, Main Street, Rathdowney, charged by the Veterinary Council of Ireland with having acted contrary to the rules of the Council. Mr. J. P. Carrigan, solicitor, Thurles, who prosecuted, said an advertisement had been inserted in a Kilkenny newspaper to the effect that he successfully treated ailments in cattle and dogs. This statement was likely to cause people to think that defendant was a qualified veterinary surgeon. Accused, who pleaded guilty, said the advertisement only meant that he could prescribe for certain diseases."

Our colleagues in the Free State have certainly given the lead to Great Britain in this matter, and the time must eventually come when we shall follow their example.

ALLOCATING GIFTS TO ANIMAL CHARITIES.

THE President, speaking from the Chair at the annual luncheon of the R.C.V.S., held in London a few days ago, made a very practical suggestion when he suggested that there should be some Central Organisation for allocating gifts to charities and hospitals concerned with animal welfare.

" It was disheartening," he said, " that while the establishment and equipment of veterinary research institutes and veterinary hospitals scarcely ever benefited by the large legacies left by animal lovers, thousands of pounds were frittered away annually in the support of institutions run by unqualified people whose main labours seemed to be the destruction in lethal chambers of small animal life, not infrequently by methods of doubtful efficacy.

" If only there could be a Charity Organisation Society for animal charities, or preferably, perhaps, a King George's fund for animal hospitals, to which the charitably inclined might direct their legacies for proper distribution under enlightened guidance, how much better would the gifts of the benevolent be husbanded, and what a help it would be towards the goal they all had before them—the prevention of all unnecessary suffering in animals.

"Was it too much to hope that in these enlightened days the view would gradually gain ground among those who desired to help ' our dumb friends ' that their charity should be directed to assist those institutions which were properly staffed by qualified surgeons, so that on the one hand the search for means of prevention of animal disease could be advanced, and on the other that the animals of the poor might have as efficient attention as the animals of the rich ? "

If this scheme could be brought into being and help given, except in emergency cases, only after proper and satisfactory investigation, it would be of real value to the sick animal of the poor owner, whose moral right, when ill or injured, in just as great as that of the animal of the well-to-do owner.

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General Articles

N.V.M.A. CONGRESS AT BELFAST, July 29th to August 2nd, 1935.

Programme.

Sunday, July 28th, 8 p.m., "At Home," North of Ireland V.M.A. (Grand Central Hotel).

Monday „ 29th, 9.30 a.m., Opening of the Congress—Civic and Academic Reception. (Queen's University.)

„ „ 29th, 10.30 a.m., Opening of Exhibition of Surgical Instruments, Drugs, etc., by the President. (Examination Hall, Queen's University.)

„ „ 29th, 11 a.m., Paper: "Red-water in Cattle." (Physics Lecture Theatre.)

„ „ 29th, 2 p.m., Short Tour to Stormont, Mount Stewart and the Ards Peninsula. (Buses leave College Square.)

„ „ 29th, 3 p.m., Visit to City Abattoir.

„ „ 29th, 9 p.m., Civic Reception. (City Hall, Belfast.)

Tuesday, July 30th, 9.30 a.m., Paper: "Coccidiosis in Bovines and Poultry." (Physics Lecture Theatre.)

„ „ 30th 11 a.m., Paper: "The Position of the Veterinary Surgeon in the Control of Milk, with special reference to Communicable Diseases." (Physics Lecture Theatre.)

„ „ 30th, 2.30 p.m., Mourne Tour. (Buses leave College Square.)

„ „ 30th, 2.30 p.m., Operations and Demonstrations in Mr. J. Ewing Johnston's Infirmary.

„ „ 30th, 9 p.m., President's Reception. (Grand Central Hotel.)

Wednesday, July 31st, 9.30 a.m., Paper: "The Modern School of Thought on the Practical Effect of Certain Unsoundnesses on the Serviceability of Riding Horses." (Physics Lecture Theatre.)

„ „ 31st, 11 a.m., Paper: "Parasitic Worms of the Alimentary and Respiratory Tracts of Bovines." (Physics Lecture Theatre.)

„ „ 31st, 1 p.m., Congress Photograph.

„ „ 31st, 2.30 p.m., Council Meeting. (Queen's University.)

„ „ 31st, 3.30 p.m., Annual General Meeting. (Queen's University.)

„ „ 31st, 8 p.m., Banquet by H.M. Government, Northern Ireland. (Grand Central Hotel.)

Thursday, August 1st, Tour of Coast Road, Lunch at Giant's Causeway Hotel; home inland. (Buses leave College Square.)

,, 1st, 9 p.m., Dance arranged by Ladies' Benevolent Guild. (Carlton Hall.)

Friday, August 2nd, 9.30 p.m., Paper: "The Work of Veterinary Officers, with special reference to the Production and Inspection of Imported Meat Foods." (Physics Lecture Theatre.)

,, ,, 2nd, 3 p.m., Closing Meeting.

Subjects for Papers—Veterinary Medicine and Surgery Section.

President: J. Ewing Johnston, Esq., M.B.E., J.P., M.R.C.V.S. Vice-President: J. Kernohan, Esq., M.R.C.V.S. Recording Secretary: R. Moore, Esq., M.R.C.V.S., D.V.S.M.

(1) "Red-water in Cattle." By F. T. Harvey, F.R.C.V.S., St. Columb. Opener: F. W. Hart, M.R.C.V.S., Enniskillen.

(2) "The Modern School of Thought on the Practical Effect of Certain Unsoundnesses on the Serviceability of Riding Horses." By Major C. H. S. Townsend, O.B.E., M.C., F.R.C.V.S., School of Equitation, Weedon. Opener: P. J. Howard, M.R.C.V.S., of Ennis, Co. Clare.

Experimental Pathology Section.

President: Professor J. Basil Buxton, M.A., F.R.C.V.S., D.V.H. Vice-President: Professor T. G. Browne, M.R.C.V.S. Recording Secretary: P. L. Shanks, Esq., B.Sc., M.R.C.V.S.

(1) "Coccidiosis in Bovines and Poultry." By H. G. Lamont, M.Sc., M.R.CV.S. Stormont. Opener: N. Dobson, B.Sc., M.R.C.V.S., Weybridge.

(2) "Parasitic Worms of the Alimentary and Respiratory Tracts of Bovines." By Colonel W. A. Wood, C.B.E., M.A., M.R.C.V.S., Cambridge. Opener: E. L. Taylor, M.R.C.V.S., B.V.Sc., D.V.H., Weybridge.

Public Health Section.

President: F. J. Daly, Esq., M.R.C.V.S. Vice-President: Major Brennan DeVine, M.C., F.R.C.V.S., D.V.S.M. Recording Secretary: A. McLean, Esq., M.R.C.V.S., D.V.H.

(1) "The Position of the Veterinary Surgeon in the Control of Milk, with special reference to Communicable Diseases." By P. F. Dolan, M.R.C.V.S., D.V.S.M. Dublin. Opener: J. N. Ritchie, B.Sc., M.R.C.V.S., D.V.S.M., Edinburgh.

(2) "The Work of Veterinary Officers, with special reference to the Production and Inspection of Imported Meat Foods." By Lieut.-Colonel T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M., London. Opener: Arthur Gofton, F.R.C.V.S., Edinburgh.

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BIENNIAL VETERINARY CONGRESS AT ALFORT, PARIS.

June 14th, 15th and 16th, 1935.

Friday, June 14th.—9 a.m., Opening Ceremony by the Minister of Agriculture. Unveiling of the Bust of Professor Railliet. Visit to the Commercial Exhibition of Drugs and Instruments, etc. Visit to the Salon of paintings and sketches, etc., done by veterinary surgeons. Opening of the Students' Hostel.

2 p.m., Films of Veterinary Surgery.* Exhibitions of new materials and instruments, etc. Lecture by M. Rigoir: "Professional Taxation." Lecture by Professor Letard: "Artificial Insemination."

Saturday, June 15th, 9 a.m.—(1) Practical demonstration of pneumatic tyres on wagons, etc., for agricultural work. (2) Lecture by Vétérinaire Commandant Carpentier: "Diagnosis by Microscopic Examination of Fæces—in Practice and in the Army."

2 p.m.—Afternoon for Practitioners: Given over entirely to those who wish to show their fellow practitioners new inventions, instruments, new operative methods and personal methods to do with the practice of veterinary medicine. Lecture by Dr. Dubois: "New Knowledge on Brucella."

Sunday, June 16th, 9 a.m.—Lecture by Vétérinaire Commandant Velu: "The Use of Germs in Warfare—Is it Realisable?" Lecture by Professor Panisset: "Pseudo-Rabies" (with Film).

2 p.m.—Official presentation to the School of the Statue commemorating the Defence of the Bridge of Charenton by the Alfort Regiment. Professional reunion.

About 7 p.m.—Social gathering and Students' Ball.

THE VALUE OF THE AEROPLANE TO VETERINARY SERVICE.

In the *Aeroplane* of June 12th, there is an account of a young aviator, Mr. John N. H. Hobday, B.Sc., M.R.C.V.S., who, as a result of his foresight, has brought the use of the aeroplane into the service in his Department in Bechuanaland, as an aid to veterinary work, to such an extent that its practical value has became recognised.

The photograph shows Government Veterinary Surgeon Hobday handing over a packet of rinderpest serum to Government Veterinary Surgeon Webb in an isolated area to which the packet could not possibly have been sent by native carriers under ten days; the forests and nature of the ground rendered it impossible, in any case by motor car; and in this instance the whole thing was accomplished successfully in three hours.

* These included a number of Surgical Operation Films by Professor Sir Frederick Hobday, of the Royal Veterinary College, London.

Mr. John Hobday, who is a B.Sc. in Veterinary Science of the University of London and M.R.C.V.S., is an old City of London schoolboy and a graduate of the London Veterinary College. He went to Bechuanaland about two and a-half years ago as a temporary veterinary inspector to assist in the inoculations against a large outbreak of foot-and-mouth disease. Now, on the retirement of Major Chase, the Chief Veterinary Officer, Mr. Hobday has been appointed in his stead, and has recently taken over the duties.

THE VETERINARY PROFESSION IN SOUTH AFRICA: VETERINARIANS IN GERMAN SOUTH-WEST AFRICA.

By W. O. NEITZ and H. H. CURZON
P.O., Onderstepoort.

Introduction.

THE object of this contribution is to place on record some notes collected from time to time concerning our colleagues in the former territory of German South-West Africa.

In order to appreciate the good work done by the German Government in general, and the veterinary administration in particular,[1] the reader is advised to consult the travels of pioneers such as Anderson (1856), Chapman (1868), etc. Chapman, for example, refers to the introduction of bovine pleuro-pneumonia. He was blamed by the Namaqua Hottentots for bringing the disease into the territory when travelling from Lake Ngami to Walvis Bay in 1855.[2] Chapman, in 1861, on the other hand, maintained (p. 413) that the disease had " been introduced (Witvlei, near Gobabis) by a party of these same vagabonds who had been cattle lifting in Ovamboland." In any case the natives adopted measures of control such as quarantine camps (p. 403), inoculation and " painting or tarring " of wagon gear. They further knew " that it was not impossible for an inoculated ox to have the disease." Chapman also refers (p. 306) to " Professor Wahlberg " trying " experiments with the tsetse fly " near Lake Ngami in 1855.[3]

Genesis of Veterinary Organisation.

In South-West Africa Protectorate, unlike the Transvaal[4] and Orange Free State, a full-time state veterinarian was available on the outbreak of rinderpest in 1896, for Wilhelm Rickmann had been sent out in 1894 as military veterinary officer. At the Inter-Territorial Rinderpest Conference held at Vryburg, C.P., on August 31st and September 1st, 1896, he could not be spared, and the German Government was represented by Baron von Schuckmann. Although a military veterinary officer, Rickmann also took charge of civil veterinary affairs until 1906, when he was placed in charge of the civil organisation as Referent für Veterinärwesen und Tierzucht. In the meantime rinderpest kept him busy.

XUM

When the disease threatened to enter the Protectorate, an animal-free zone, 20 km. wide, was created, and the veterinary staff increased by two. Owing, however, to the disease being carried by game, the zone proved useless, and in April, 1897, the first outbreak was reported. Rickman and Dr. Kuhn devised a method of immunisation, but this was not so satisfactory as that of Koch, whose assistant, Dr. Kohlstock, arrived in June, 1897, to demonstrate the technique. Government officials and farmers were trained to carry out inoculations, and the results were relatively good, 50–80 per cent. of cattle being saved in infected areas. Three years later the quarantine restrictions were removed, but unfortunately the disease broke out again in the north. Strict measures of control were adopted and the disease was arrested before it reached the southern part of the country (Leutwein, T: *Elf Jahre Gouverneur in Deutsch-Süd-westafrika*, p. 125, 1906).

Military Veterinarians *(Kaiserliche Schutztruppe).*

Owing to the numerous native campaigns, some, however, of short duration, it was necessary later to employ several military veterinary officers. Rickman, it is known, took part in the Witbooi Bastards campaign of 1894 and the Herero Rebellion of 1904; but being closely associated with the military, it is probable he rendered veterinary assistance in the other campaigns, *viz.*, Khauas Hottentots and East Hereros (1896), Afrikander Hottentots (1897), Swartbooi Hottentots and North-west Hereros (1898), Grootfontein Bastards (1901), and Bondelswarts (1903).[5] (*See* Leutwein's "Elf Jahre Gouverneur in D.S.W.A.," p. 432).

Several veterinary officers lost their lives during these trying periods, but details regarding only V. O. Rogge are at present available, as follows:

> In 1905 . . . Rogge came from Bethanie on horseback to Luderitz, accompanied by Trooper Fiebicke, to fetch the mails and money for wages. They started on the return journey to Bethanie on January 10th, and were last seen in Kubab, from where they intended to ride to the next waterhole at Ukumas. They never reached it, and in spite of a thorough search in the desert the two men could not be traced.
>
> In 1911, Fiebicke's bayonet and belt were found in the dunes, whereupon the search was renewed. In July, 1912, a police patrol found on the slope of a sand dune halfway between the stations of Kolmanskop and Grasplatz the body of . . . Rogge, which could be easily identified since it was perfectly mummified, having been covered by the sand, which was later blown away by the strong wind.
>
> On the body all the letters and money, about 20,000 marks . . . were found, with the result that the letters were delivered to the addresses after seven years.
>
> In a notebook found with the body, Rogge said goodbye to his mother and sister in Germany, and wrote that he had lost his way in the desert, got separated from Fiebicke, and the horses had run away.
>
> To avoid an awful death from hunger and thirst he had shot himself. Rogge's remains were buried in the cemetery at Luderitz in 1912. Fiebicke, whose remains were found in 1928 . . . was buried on March 16th, 1930, at Luderitz, his identification disc having been despatched in the interim to Berlin for verification.—*Sunday Times*, March 16th, 1930.

Other veterinarians who lost their lives in the Herero War of 1904–5 were Stabsveterinär Moll and Stabsveterinär Rechel, who died from typhus at Windhoek in 1904; Oberveterinär Borowski, wounded August 11th, 1904, at Waterberg, and Oberveterinär Jantze, wounded January 5th, 1905, at Gochas; and Civil Veterinary Surgeons Kaempny and Sepp, killed in 1904 at Karibib and Ovi-

kokorero respectively. Other names given (along with photos) by the *Berliner Tierärztlichen Wochenschrift* are Albrecht, Schröder and Hagemeier.

The principal veterinary officers were as follows : 1894–1906, Staff Veterinary Officer W. Rickmann[6] ; 1906–1911, Staff Veterinary Officer Rachette ; 1911–1913, Staff Veterinary Officer Hancke ; 1913–1915, Staff Veterinary Officer Knochendöppel.

Oberveterinaere were : Hoerauf (1901-1907) ; Rassau (1904) ; Reinecke (1906), Gamams ; Jakobsen (1906), Windhuk ; Kitzel (1907), Gamams ; Fuchs (1912–1915) ; Sommerfeld (1914) ; Just (1914) ; Gottschalk (1914) ; Meissner (1914).

At the Inter-territorial Veterinary Conferences at Bloemfontein (December, 1903) and Capetown (May, 1904), Messrs. von Lindequist and Rickmann, and Vice-Consul Dr. F. Keller, respectively, represented South-West Africa.

Civil Veterinarians.

It has been mentioned that in 1906 the veterinary organisation was definitely divided into two sections : the military branch being under Staff Veterinary Officer Racketts, and the civil branch under Rickmann. This arrangement continued until 1911, when the civil duties, since 1907 supervised by Otto Henning, were divided as follows : (*a*) Field (Administrative) Division under Professor Dr. Walter Gmelin ; (*b*) Research, under Dr. Hans Sieber ; and (*c*) Animal Husbandry, under Henning.

It should be emphasised that prior to this, in 1910, Professor Dr. R. Ostertag, Director of the Veterinary Section of Public Health in Berlin, had paid a visit not only to South-West Africa to study sheep-pox, but to all the territories of Southern Africa in order to gain experience in colonial veterinary problems. His experiences are contained in a most instructive volume " Veterinärwesen und Fragen der Tierzucht in Deutsch-Südwestafrika," published in 1912 by Gustav Fischer, of Jena.

The following is a list of civil veterinary surgeons kindly compiled by Dr. Hans Sigwart : Kaempny (1903), Friedrichsfelde, died 1904, Karibib ; Sepp, died 13.3.04, Ovikokorero ; Dr. Leipziger (1905), Gamams, laboratory assistant ; Schroeter (1906), Friedrichsfelde ; Dr. Scheben (1908), Rehoboth ; Wilde (1908), Grootfontein ; Dr. Lux (1908), Friedrichsfelde-Keetmanshoop ; Struwe (1908), Hasur ; Zbiranski (1909), Grootfontein ; Hollaender (1909), Windhoek ; Dr. H. Bauer (1910), Rehoboth ; Dr. G. Schmid (1910), Grootfontein ; Neugebauer (1910), Windhoek ; Dr. Boden (1910), Karibib ; Dr. H. Sigwart (1912), Otjiwarongo ; Dr. Guenther (1911), Omaruru ; Dr. H. Sieber (1911), Chief, Gamams Laboratory ; Dr. Rhode (1912), Gibeon ; Dr. Ruppert (1912), Gamams, Windhuk ; Schiller (1912), Gobabis ; Martenstein (1913), Gobabis ; K. Klabetzki (1912), Okahandja ; Dr. Bailer (1914), Gamams, Windhuk ; Dr. Hannemann (1914), Karibib ; Dr. A. Maag (1914), Windhuk, died January, 1933 (*see Jl. S.A.V.M.A.*, iv, 2).

For information concerning the Veterinary Laboratory at Gamams, *see* Appendix 2, written by Dr. G. Schmid. On the taking over of the Territory in 1915, Irvine-Smith[7] states (p. 404): "Members of the S.A. Veterinary Corps saved the Karakul sheep from slaughter for food purposes," and "A . . . detailed inspection was also carried out at the Gamams Veterinary Bacteriological Institute, which was also being carefully guarded for handing over to the civil authorities."

Henning, on succeeding Rickmann in 1907, had his hands full controlling communicable diseases, undertaking research, and supervising the stock problems of the Territory. In connection with the last mentioned, he frequently visited the colonies adjoining South-West Africa, and on one occasion was sent to Australia in order to inquire into dairy, meat and wool matters. He returned from Australia with a ship-load of pure-bred Merino ewes and rams for disposal on easy terms to the farming community.

With regard to representation at inter-territorial conferences, Vice-Consul von Jordan of Windhoek was present at Bloemfontein in 1907. To the Pretoria meeting in 1909 Henning came, and, fortunately, a photograph of the group taken at the time is contained in the Proceedings of that Pan-African conference (*Pamphlet* 1,747, *Transvaal Dept. of Agriculture*).

On July 9th, 1915, the Union Military Forces having occupied the Protectorate, the German régime came to an end. An account of the veterinary operations is given in the chapter dealing with South-West Africa in the "Official History of the War (Veterinary Services)."

After the bulk of the troops had returned to the Union, a skeleton veterinary organisation was left under Colonel G. W. Lee,[8] and since then the following S.V.O's. have controlled the destiny of the profession in the Protectorate: Colonel A. Goodall (1920–24), Mr. R. S. Garraway (1924–1927), Mr. A. McNae (1928–March, 31st, 1934), and at present Mr. M. M. Neser.

It is realised only too well that these notes are exceedingly fragmentary, but it is hoped those who can provide further details will communicate with the authors.

Appreciation.

We desire to express our indebtedness not only to the late Otto Henning for furnishing notes regarding the veterinary organisation in South-West Africa, but also to Drs. Hans Sigwert and G. Schmid, who came to the country before the Great War.

APPENDIX I.

Brief Biographies of Chief Veterinary Surgeons in South-West Africa.

Wilhelm Rickmann[9] (1869–1916), was born on 11.8.1869, at Pollum (West Prussia). On completing his studies at the Military Veterinary Academy, Berlin,

in 1894, he proceeded to South-West Africa as a military V.O., being the first veterinarian in the Territory. For his services in connection with rinderpest, in 1897, he received the Kronenorden (fourth class). During his long leave in 1902 he worked at the Hygiene Institute of the Berlin Veterinary College, and on his return to South-West Africa continued his studies of local problems. About this time he was granted the designation Kaiserlicher Veterinärrat.

In 1907 he returned to Germany, and for his past services received the Order of the Red Eagle (fourth class). He took up post-graduate work at the Pathological Institute, Berlin Veterinary College, and at the Institute for Experimental Therapeutics, under Ehrlich, at Frankfort a/M. About this time he received his Doctorate at Berne, and was then appointed director of the Serum Department of Messrs. Lucius and Brüning's Chemical Works at Höchst a/M. Here he issued many useful publications, the must interesting to us in South Africa being "Tierzucht und Tierkrankheiten in Deutsch-Südwestafrika," published in 1908 by Messrs. Richard Schoetz, of Berlin. He died from influenza on January 13th, 1916, leaving a wife (whom he married at Swakopmund) and two sons. His memory, along with that of Hutcheon and Wiltshire, will always be cherished by the veterinary profession of the subcontinent.

Otto Henning (1865–1933) qualified as a veterinary surgeon at Stuttgart Veterinary School in 1887, and four years later passed the Staats Examen of the State of Württemberg. In April, 1892, he joined the Cape Colony C.V.D., and soon after his arrival he was instructed to investigate a disease of calves (liver disease—paratyphoid) at Koonap, Eastern Province. His annual reports testify to his sound veterinary training, his unusual diligence and keen observation. Among the more important of his contributions to veterinary science was his work in connection with the toxicity of *Cynanchum capense* in 1894.

When rinderpest threatened in 1896, he was seconded to the Orange Free State Government, and during Dr. Koch's stay at Kimberley, from December, 1896, to March, 1897, Henning acted as one of his assistants. His appointment as State Veterinarian, O.F.S., was later confirmed in November, 1897, and this he held until March, 1900, when the British occupied Bloemfontein. The new authorities, although requesting him to hand over the keys of his office, gave him an appointment as Veterinary Lieutenant in the S.A. Constabulary. Within a few months he not only rose to the rank of Captain, but was appointed Divisional V.O. of the O.F.S., and received the Queen's Medal. During 1901–2, as State Veterinarian, he combated rinderpest in Basutoland.

He took charge of the veterinary duties of the Repatriation Department in the O.F.S. from August, 1902, until the end of 1904, when he was appointed V.O. to the Basutoland Administration. This post he occupied until his transfer to the Government of South-West Africa in December, 1907. He succeeded Veterinärrat Dr. Wilhelm Rickmann as Chief Veterinary Officer, which position entailed administration not only of the Field Administrative Section, but also of the research work at Gamams Veterinary Laboratory and control of animal

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husbandry. In 1912, owing to expansion of each of these divisions, Henning was appointed to direct the activities of only the Stock Division, which position he held until the British forces occupied the Territory.

In 1921, he was taken on as a member of the South-West Protectorate Veterinary Department. He retired in 1923, and farmed at "Felsenquelle," Grootfontein. He died on November 10th, 1933. For his obituary notice, *see Jl. S.A.V.M.A.*, v, 1, p. 69. The following is a list of some of his lectures and papers:

Date.	Subject.	Reference.
1893	Glanders.	(?) *Friend*, 4.8.1893.
1894	Sponssiekte. Protective inoculation and its usefulness.	*Midland News*, 22.9.1894.
1894	Why are stock diseases in the Colony on the increase and what steps should be taken to prevent and eradicate them?	(?) *Friend*, 18.3.1894.
1894	Experimental Farms.	*The Racing Calendar and Agr. Jl.*, 31.5.1894.
1895	Dogs and their diseases.	*Cape Agr. Jl.*, 7.2.95, p. 55.
1903	Glanders.	(?) *Friend*, 5.2.1903.
1904	The question of scab.	(?) *Friend*, 12.11.1904.
	Droes, glanders, farcy or malleus.	Lecture, Bloemfontein.
	Castration.	Lecture, Maseru.
	Scab in sheep and goats (including angoras) in Basutoland.	MS.
	A chat on diseased meat; what a man may and may not eat.	Lecture, Selborne College, Basutoland.
	Stock-raising industry.	Lecture, Maseru, Basutoland.
1909	Blauzunge, Bluetonge, Malariartiges Katarrha lfieber der Schafe.	*Der Farmer*, Windhoek Beilage *Windhuker Nachrichten*, 2, Jhrgng., Nos. 5 and 6, Mai, 1909.
1909	Massregeln zum Schutze gegen Viehseuchen insbesondere der Einführung eines Viehbrandregisters für das ganze Schuzgebiet.	(1) *Deutsch Sudwestafrikanische Zeitung*, (Windhuk) 11 Jhrgng., No. 45, 1909; (2) *Windhuker Nachrichten*, 1909.
1909	Pferde-Malaria.	*Windhuker Nachrichten*, 25.8.1909, and 28.8.1909.
1909	Straussenzucht.	*Der Farmer*, Windhuk; Beilage *Windhuker Nachrichten*, 2 Jhrgng., Nos. 8 and 9, July and August, 1909.
	Ostküstenfieber	*Windhuker Nachrichten*, 8.6.1910.
1911	Ueber die Förderung der Straussenzucht.	*Der Sudwestbote*, Windhuk, 8 Jhrgng., 1911, No. 43–48.
1912	Wooschafzucht.	(1) Landwirtschaftliche Beilage des *Ambtsblatts fur das Schutzgebiet Deutsch-Sudwest-Afrika*, 2 Jhrgng., Nos. 4 and 5, 18.6.12 and 1.7.1912. (2) *Der Sudwestbote*, Windhuk, 9 Jhrgng., No. 73 and 80, 19.6.12 and 5.2.12.
1912	Schafschur und Aufbereitung der Wolle in Südafrika.	(1) *Der Sudwestbote*, Windhuk., 9 Jhrgng., No. 87, 88, 89, 90. (2) Landwirtschaftliche Beilage des *Amtsblatts fur das Schutzgebiet Deutsch-Sudwestafrika.*
1912	Denkschrift über die Rinderzucht des Deutsch-Südwest-afrikanischen Schutzgebiet.	Beilage IV, zum Etat für das Südwestafrikanische Schutzgebiet auf das Rechnungsjahr, 1912.
1913	Ein Interview.	*Der Sudwestbote*, Windhuk, 1913.
1913	Die Magenwurmseuche der Schafe.	*Der Sudwestbote*. Windhuk, 10 Jhrgng., No. 6, 1913.
1914	Südwestafrikanische Zuchtziele.	*Sudwest*, Windhuk, 1914, No. 48 and 49.

Date	Subject.	Reference.
1914	Ueber australische Schafzucht.	*Sudwest*, Windhuk, 1914, Nos. 35 and 36.
1914	Translation of M. Karpoy's Einiges über Karakul-Schafzucht.	*Sudwest*, Windhuk, 27.1.14, 30.1.14, 6.2.14, 3.2.14, 1.4.14, 7.4.14, 10.4.14, 24.4.14, 28.4.14, 1.5.14.
1920	Die Kennzeichung des Kleinviehs.	*Mitteilungen der Farmwirtschafts Gesellschaft f. S.W.A.*, 15.8.1920.
1921	Südwestafrika und Fleisch-export.	*Landes Zeitung*, Windhuk, 1921.
1921	Die Kastration der Kühe.	*Mitteilungen der Farmwirtschafts Gellschaft fur Sudwest-Afrika*, 15.7.21, 1.8.21.
	Preisrichtes and Punktierverfahren (Schluss).	
	Translation of article of Dr. A. Theiler on "Verhütung und Bekämpfung des Ostküstenfiebers.	
	Trypanosomen.	
	Schafpocken.	

Although the above list is incomplete, yet it contains much useful information Henning left most of his literature to the Library, S.A.V.M.A.

James Irvine-Smith (1876–19—), as the Director of Veterinary Services, Union Defence Forces, during the campaign in South-West Africa (1914–1915), was responsible for veterinary administration until Colonel G. W. Lee, D.S.O., M.R.C.V.S., was appointed Director of Agriculture in 1916. An account of Colonel Irvine-Smith's career appeared in *The Sun* and *Agricultural Journal of South Africa*, January, 1930.

George William Lee (1872–19—). Born September 25th, 1872, and qualified at the Royal (Dick) Veterinary College in 1893. He first came to South Africa as a member of the second English Rugby team in 1896, and thereafter took part in the Mashona Rebellion of the following year. On the outbreak of rinderpest he proceeded to the Victoria Compound, Kimberley, early in 1897, in order to study rinderpest immunisation under Professor Koch. He then returned to Salisbury, together with C. E. Gray and Osborne O. A. O'Neill, all of whom had received appointments under the Chartered Company. In 1898 he joined the Southern Rhodesian Volunteers, and on the outbreak of the Boer War was appointed veterinary officer to the transport of the Rhodesian Field Force under General Carrington. On the disbandment of this force in September, 1900, he returned to civil duty for a short time, and was the veterinarian who inspected on board ship at Beira the 1,000 Australian cattle which are believed to have brought East Coast fever into Southern Rhodesia.

From the end of 1900 until the termination of hostilities, Lee was a member of Kitchener's Fighting Scouts under Colonel Colenbrander. Later he was attached to the Right Wing, and W. C. Lowe (formerly of the Cape Veterinary service) to the Left Wing. For his services in this campaign he received the Queen's and King's medals with six bars.

He then received an appointment in the Transvaal Repatriation Department, and later (as from September 30th, 1903) entered the C.V.D., with which he was associated until the outbreak of the Great War, when he proceeded on active

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service with the S.A.V.C. to German South-West Africa, and ended up as an assistant director of veterinary services. For six months (1904–5) Lee was sent on special duty to the Bechuanaland Protectorate in view of the spread of East Coast fever in adjoining territories.

During the military occupation of South West Africa Protectorate, Lee was appointed Director of Agriculture, and with a small staff of veterinary officers was kept busy controlling epizootics such as glanders, anthrax, scab, etc. In 1920, when a civil administration was established, Lee resigned from the civil service and took up ranching in South-West Africa, in which venture he was eminently successful. He was an enthusiastic member of the Transvaal V.M.A. In 1920 he resigned from the S.A.V.M.A.

Alexander Goodall (1879–1930) succeeded Colonel Lee as Officer in Charge of Agricultural and Veterinary Services in 1920. After a spell of four years in the Protectorate he returned to the Union as S.V.O. Eastern Cape Province. *See Jnl. S.A.V.M.A.*, December, 1930, p. 116, for his career.

Roger Sutton Garraway (1876–19—), followed Colonel Goodall as Senior Veterinary Officer in 1924, transferring as S.V.O. to the Orange Free State on November 29th, 1927. He retired from the Union Department of Agriculture in September, 1931. *See Jnl. S.A.V.M.A.*, October, 1931, p. 165.

Alexander McNae (1877–19—) was born at Maxwelltown, Scotland, on February 9th, 1877, and qualified at the New Edinburgh Veterinary College in May, 1899. He came to South Africa as a civil veterinary surgeon attached to the A.V.D. at the beginning of 1901. After the Boer War he served from September, 1902, to October, 1904, with the Repatriation Department, Transvaal. Thereafter he joined the Transvaal Department of Agriculture, and until 1915 was in charge of the Stud Farm, Standerton. During the Great War he joined the S.A.V.C., and proceeded to German East Africa. On his return he performed the duties of a Government veterinary officer, and on January 1st, 1928, was appointed Senior Veterinary Officer of South West Africa. Since his retirement on March 31st, 1934, he has been associated with the Veterinary Vaccine Agency, Johannesburg.

APPENDIX II.

Gamas Veterinary Laboratory. (By Dr. G. Schmid, *Omaruru.*)

The Veterinary Laboratory at Gamams was established on quite a small scale in 1898 by Wilhelm Rickmann, the energetic and scientific chief of the veterinary department from 1898 to 1906. The laboratory under Rickmann did useful work, especially at the time of the rinderpest outbreak of 1900, and also in connection with the investigation and combating of lung sickness, horse sickness, and other infectious and non-infectious stock diseases. (*See Transvaal Agricultural Journal*, ii, p. 204).

The policy at first was to establish further smaller laboratories at Friederichs-

felde in the centre of the Territory, at Gariganis (Keetmanshoop) in the south, and at Grootfontein in the north. In the beginning these laboratories had not only to serve for the investigation of animal diseases, but also as centres for the development of the livestock industry. Small herds of pure-bred cattle and sheep were kept under veterinary control, and bulls and rams were distributed to farmers. These laboratories had to be given up after a time, as it was found impossible for the few Government veterinary officers scattered over such a wide area to do their field work properly and at the same time to attend to their laboratory duties. As a result research work was concentrated at the head institution at Gamams, where a scientific assistant (Dr. Leipziger) was appointed in 1905.

Particularly useful bacteriological and serological work was done by Dr. H. Sieber, who took entire charge in 1911. Not only were biological products for veterinary use prepared, but also smallpox lymph and typhus serum. Veterinarians arriving from Germany passed through a short course at Gamams before taking up district duties. It was intended to extend the activities of the Institute by the addition of zoological, botanical and chemical sections, but as a result of the Great War this was impossible. Since the occupation of the Territory the laboratory has not been used as such. At present it is a School of Agriculture under the Department of Education.

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[1] South-West Africa, although recognised as German territory in 1884, was not formally annexed by Germany until 1890.

[2] The disease was introduced into Cape Colony from Holland in 1853.

[3] Wahlberg had landed at Walvis Bay. He was killed by an elephant near the Thamalakane River (Bechuanaland Protectorate) in 1857.

[4] Dr. A. Theiler, prior to rinderpest, had only a part-time State appointment.

[5] In 1906 there was another rebellion, and Morenga, the Hottentot guerilla leader, was captured by the Cape Police. Interned at Tokai, C.P., for a year; he returned to Gordonia after hostilities were concluded, but again gave trouble. Finally he was killed in September, 1907, in the engagement with the C.M.R. and C.P. in the triangle between the frontier and the Orange and Molopo Rivers.

[6] In 1903 the German military veterinary designation *Rossarzt* was dropped.

[7] See Chapter 16, "Official History of the War (Veterinary Services)," published by His Majesty's Stationery Office in 1925. Editors: L. J. Blenkinsop and J. W. Rainey.

[8] Assisting the Director of Agriculture were Capt. E. E. Stokes and Capt. G. T. Cannon, and later, Capt. E. M. Jarvis, Capt. W. McKie, and Capt. T. le B. Revington, who arrived from German East Africa.

[9] This sketch is taken from the *Berliner Tierarztlicher Wochenschrift* No. 10, 9.3.1916, pp. 118–9, and was kindly obtained for us by Dr. Hans Sigwart from Dr. H. Zeller, Oberregierungarat, Reichgesundheitsamt, Berlin.

THE PRACTICAL ASPECTS OF STERILITY IN CATTLE.

By J. F. DONALD TUTT, F.R.C.V.S.
Winchester.

(*Continued from May issue of* THE VETERINARY JOURNAL.)

IN the preceding portion of this article it has been possible to assume that many cases of sterility in milch cattle can be attributed to disorders of internal secretion. Before leaving this side of the subject there is a still more important

aspect to be dealt with, and that is the question of periodic fertility and sterility. Attention has been drawn to this by many observers, such as Marshall,[9] Jolly,[10] Halnan,[11] Keller,[12] McLean,[13] and Hammond.[14] Perhaps this problem has received most attention in the case of the human female. Opinion is still sharply divided on the question of the so-called " safe period " in woman, *i.e.*, the period at which conception will not occur; but judging by the success achieved by Professor Hermann Knaus,[15] head of the Clinic for Gynæcology and Obstetrics of the German University of Prague, and of his students, it would appear to be proved that not only is there such a period of what one may term " absolute sterility," but there is a definite period only at which conception is possible, and often a very limited one. In dealing with cases of alleged sterility, Professor Knaus, after satisfying himself that both parties were potentially fertile, and by a close examination of the œstral table, has been able by advising intercourse to be restricted to a particular day or days, to cure the alleged sterility. It is well known that the cow comes on heat at intervals of twenty-one days, but during this cycle she is only fertile for forty-one hours after the beginning of her heat, her optimum fertility occurring in the tenth hour after the appearance of the first signs of heat. It appears, therefore, that the most useful of all domestic animals, whose reproductive functions have the greatest economic importance for society, has a period of physiological sterility which occupies more than nineteen days out of a cycle of twenty-one.

It has long been recognised that the bitch is fertile at the period in which she undergoes her most intense sexual excitement, nine to twelve days after the beginning of the pro-œstral bleeding. The bitch is not only sterile between her heats, as Coste[16] has shown; but even in the three weeks or so during which her heat may continue, she is capable of conceiving only on a few days. On the other hand, it is impossible to name a single instance of a mammal which is perpetually fertile, and has at the same time a cyclical ovarian function.

It must not be forgotten that an unfertilised ovum has a very short life because of the essential relationship between ripening and fertilisation. In short, the processes which underlie maturation are destructive, and the ovum cannot survive them for more than a certain time. If fertilisation does not take place there is no second stage of maturation (Fischel[17]).

Other factors which are too academic to be discussed here enter into the question why the ovum is unable to wait a matter of days for the sperm cells, and also a period when it is impenetrable by spermatozoa. It is, therefore, possible to assume that there are not a few cases of alleged sterility which can be rectified by a closer attention to the œstral history of the animal, guided where possible by previous pregnancies. Irregularity in the œstral cycle is common in the cow. Œstrus may occur under the recognised normal period of twenty-one to twenty-three days, or it may be absent for weeks or months. Such irregularity is by no means accompanied by a definite and constant lesion in the ovary or uterus. The findings in such cases are more often than not most contradictory.

In cases where œstrus occurs under the normal period, it is by no means safe to assume that a projection found on one or both ovaries is of necessity a cyst. An attempt has been made to draw a practical guide in this connection.[18] In one case one ovary may be very small, and is hard to the touch, whilst the other is greatly enlarged and feels " flabby." In another both ovaries appear to be more or less atrophied (particularly is this the case when the cow is in more or less constant œstrus). In another, both ovaries may be enlarged, and may or may not contain cysts, either in their interior or on their exterior, or in close apposition.

In cases where œstrus is absent for a long period, the ovaries may appear quite normal: they may be atrophied in some instances, but in most cases no departure from the normal can be detected.

Too often in either of these cases is an erroneous diagnosis of endometritis made. It must be remembered that in a cow that has had a calf the uterus always remains more or less enlarged, and it would appear that for all practical purposes a diagnosis of endometritis should be restricted to the presence of a discharge of varying degree and intensity. If no discharge is apparent from vaginal examination, the cervix should be retracted and squeezed, when if endometritis is present, a slight discharge in many cases will exude through the external os.

Treatment.—In cases where the œstral cycle is manifested under the normal period, no attempt should be made to treat it by sex hormone. In fact its use in such cases is strongly contraindicated. Treatment should be restricted to massage of the ovaries, and the dispersal of cysts when present. In this connection it may be mentioned that it appears that if cysts are present on the exterior of the ovary and in the interior, the dispersal of those on the surface is in most cases sufficient to bring about conception.

Cysts in the interior of the ovary are in most cases very hard, if not impossible, to rupture without using considerable force, with resulting damage to the ovarian tissue. To correct the irregularity nothing appears better than the use of a chemico-therapeutic product known as Contramine, to which attention was first drawn by Barker.[19] This is injected intramuscularly in doses of 2 c.c. to 4 c.c. at intervals of six to seven days. It is usual to make at least two, or in some instances three, injections. Provided that no endometritis is present, the use of parat leaves is to be recommended. These have been described.[20] The procedure is to insert two leaves at five- to seven-day intervals, well forward into the vagina, making three applications before service, and three after service ; but they should not be used on the day of service.

If endometritis is present, this must receive attention. It has been asserted by other observers that the presence of even a minute quantity of pus in the uterus will prevent the onset of œstrus. This statement appears to be incorrect, as œstrus has been observed even in cases of pyometra where the uterus has contained as much as a gallon of pus.

Some workers use a strong solution of iodine, and use as a general routine

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[*Photograph by Mrs. Webb*

THE VALUE OF THE AEROPLANE TO VETERINARY SCIENCE.

Mr. John Hobday, G.V.O., delivering vaccine against foot-and-mouth disease to Mr. Webb, G.V.O., at Mohembo Aerodrome, on the edge of the Okawamba Swamps, Bechuanaland. By means of parachutes virus has been landed successfully in three hours at places in inaccessible to motor cars and to which native runners would have taken ten days.

Maiden Lactation in a Heifer.

Article by A. Shoshan, M.R.C.V.S., *page* 280.

a 5 per cent. solution of Lugol for mild degrees, and pure tincture in severe cases. It is my considered opinion that nothing is to be gained by using a solution of Lugol stronger than 1 per cent., which should be put up in normal physiological saline solution. Two hundred and fifty to 500 c.c. is injected, and allowed to remain there. If there is an accumulation of pus, this should be evacuated. In these cases, in preference to iodine solutions, better results follow the injection of a solution of Rivanol (Bayer) in liquefied glycerine, in the strength of 1:2000. In cold weather the glycerine solution should be warmed before use. If after three such injections (250 to 500 c.c.) at intervals of five to seven days pus is still present, good results often follow the use of Spuman preparations. Of these, that put up with Protargol appears most effective in severe cases, whilst in what has been termed "leucorrhœa," and of not appreciable amount, that composed of acid salicylic is very effective. The preparation is sent out in the form of small sticks, and ten to twelve of these should be inserted as far into the cervical canal as possible.

On coming into contact with moisture, they rapidly dissolve, forming a foam, and so distributing the medicament all over the uterus. It appears a pity that the various makers of pessaries do not construct them on the same basis, as it is certain that the majority of pessaries on the market, especially those with a cocoa-butter basis, are very limited in their action and take a long time to dissolve. In one instance where a cow died from septic metritis, and the herdsman had inserted two of these pessaries forty-eight hours before death, on post-mortem they were found practically unaltered in the uterus. Lugol, 1 per cent., in normal saline solution can be used as a final cleaning-up agent in such cases.

In cases where œstrus is absent for weeks or months, sex hormone therapy is to be recommended, and judging from the results obtained on a large number of cases, nothing appears comparable with that made by the Bayer Company and sold under the name of Prolan. Its non-success in earlier cases can now be ascribed to using too small a dose, and further neglecting to carry out ovarian massage. Other treatment as for the preceding.

It is advisable in both these cases to make quite certain that the animal is not a reactor to the agglutination test for contagious abortion. If it is, a reliable vaccine or preparation (Contramine or Rakulin) should be used in conjunction with other measures.

To attempt to preserve conception in these cases, and when no pathological condition exists in the uterus or its adnexa, use may be made of either wheat-germ oil,[21] or injections of extract of corpus luteum. There does not appear to be anyr elationship between these cases and the calcium blood content, although such has been asserted.[22]

Attention has been drawn to conditions which govern the ovum, and notice must now be made of the spermatozoa. The scrotum is of physiological importance as a mechanism for regulating the warmth of the testes. Crew and Funkul[23] were able to explain the true reason for sterility in cryptorchism by realisation

of this fact. It has been proved that the motility of the spermatozoa in the normally functioning epididymis is cut short by exposure to the temperature of the abdomen. At the same time motility may not be a criterion of fertility. Knaus[24] has shown that not only the specialised testicular epithelium, but also the spermatozoa are damaged by the abdominal temperature, and he concludes that the spermatozoa of all mammals with scrotal testicles lose their fertility within forty-eight hours of coitus under the influence of the abdominal temperature to which they are exposed in the female genitalia and of the alkaline secretion of the accessory male sex glands with which they are mixed during ejaculation.

The fertility or otherwise of the semen would appear to depend not only on the spermatozoa being normal and active, but in the number present in an ejaculation. Walton[25] was able to show that the fertility of the rabbit begins to decline when the seminal fluid contains less than a million spermatozoa per cubic centimetre, and disappears altogether when the spermatozoa content is reduced to 3,000 per c.c. The amazingly abundant spermatogenesis that takes place is not an evidence of prodigal wastefulness, but is an absolute necessity for fertilisation. Millions and millions of spermatozoa are needed in order that a few may be successful in penetrating the powerful defence works of the mucosa of the female genital tract and reaching their objective. This defensive armament of the uterus against spermatozoa has been described by White,[26] and appears from the studies of Kugota,[27] Lotze,[28] and Schultz,[29] to be less powerful at the time of ovulation than during the other days of the ovarian cycle. Grafenberg[30] has noted a decline in the acidity of the vaginal secretion at this time, a condition which should improve the chances of a meeting between ovum and spermatozoon. The old method of injecting a solution of bicarbonate of soda in warm water appears to be justified, and it may be noted that in recovered cases of vaginitis good results have followed the injection of such a liquid, both before and after coitus ; one hour being allowed before coitus, and a second injection being made three to four hours after.

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[20] Tutt : *Veterinary Record*, vol. xii, new series, 1932, p. 1379, p. 1448 ; vol. xiii, new series, 1933, p. 113 ; vol. xiv, new series, 1934, p. 211.
[21] Tutt : THE VETERINARY JOURNAL, vol. lxxxix, 1933, p. 416.
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(To be continued.)

NECROTIC ENTERITIS OF THE PIG AND ITS DIFFERENTIAL DIAGNOSIS.

By F. BECKETT, F.R.C.V.S.
Blandford, Dorset.

Introduction.

THIS article has been written purely from the aspect of the general practitioner, and is produced in an attempt to show that in a great number of outbreaks of suspected swine fever the disease present is in reality necrotic enteritis. The outbreak here described occurred in a large herd of both pedigree and cross-bred pigs. The number of pigs on the estate varied between 3,000–4,000 animals. The total number on May 16th, 1929, was 3,543. The primary object for which the herd was maintained was the production and sale of bacon pigs of 200–220 lb. at 6½–7 months old. Periodical sales of pedigree stock were arranged, and also the marketing of porkers to suit existing markets. Berkshire, Large White, Tamworth and a small number of Large White Lop-eared pigs were kept. The Berkshire herds were founded in 1918, and gilts of the best type were purchased from the leading breeders. They were chosen for length and fineness of shoulder, with the object of producing a good type of bacon pig by crossing gilts from these herds with either Large White or Tamworth boars. The Large White herd was found in 1925, the Tamworths in 1926, and a few Large White Lop-eared pigs were purchased in 1929. A few Saddlebacks were also acquired. The management falls into three sections:

(1) Breeding.

Two systems were in existence:

(*a*) *Permanent Breeding Depots.*—Following service, the sows are turned out on the grass plots. There is a large wooden shelter in each plot, and the number of sows carried per acre is five to six. The sows remain in the plots until a week before farrowing, when they are taken into the farrowing pens. They remain in the pens from four to fourteen days after farrowing, the length of time depending on weather conditions, and each sow is then moved into a sty with access to one-fifth of an acre of grass. The pigs are weaned at eight weeks.

(*b*) *Movable Breeding Depots.*—These consist of small movable pens (36 feet by 27 feet), with a portable wooden shelter in each. The pen accommodates either three dry sows, or a sow and her litter.

(2) Store Pigs.

Both pedigree and cross-bred stores are kept in open field-pens, the size of which is 36 feet by 27 feet. When practicable, each litter is kept in a separate pen. The store period lasts from eight to twenty weeks.

(3) Fattening Pigs.

At the age of twenty weeks the store pigs are brought into the fattening depôts, each of which contain about 300 pigs. These depôts are divided into yards, each yard accommodating from twenty-five to thirty pigs. The pigs remain in these yards about one month, after which they are placed in sties for the final fattening.

Rations.

The composition of the rations, from data provided by the Thames Milling Company, is as follows :—

No. 1.—For Suckling and Steaming-up Sows.

Composition.	Analysis	Digestible Nutrients.
13 parts soya bean meal	Moisture, 13.1	Protein, 13.6
22 parts barley	Protein, 16.0	Oil, 3.0
20 parts middlings	Oil, 3.4	Fibre, 3.2
15 parts pollards	Fibre, 5.7	Carbohydrates, 48.7
10 parts manioc meal	Carbohydrates, 56.3	Starch equivalent, 71.18
½ part cod-liver oil	Ash, 5.5	
10 parts whey paste		
2 parts seaweed salts		
1 part minerals		

Manurial value to the nearest 6*d*., 21*s*. per ton.

No. 1A.—For Store Pigs, one Fortnight after Weaning.

Composition.	Analysis	Digestible Nutrients.
13 parts soya bean meal	Moisture, 12.5	Protein, 15.3
35 parts barley	Protein, 18.0	Oil, 2.2
15 parts middlings	Oil, 2.5	Fibre, 3.0
15 parts pollards	Fibre, 5.3	Carbohydrates, 48.7
12 parts manioc meal	Carbohydrates, 56.6	Starch equivalent, 70.9
10 parts whey paste	Ash, 5.1	
2 parts seaweed salts		
1 part minerals		
½ part cod-liver oil		

Manurial value to the nearest 6*d*., 21*s*. 6*d*. per ton.

No. 2.—For Dry Sows and Store Pigs.

Composition	Analysis.	Digestible Nutrients.
9 parts Soya bean meal	Moisture, 13.4	Protein, 12.2
40 parts barley	Protein, 14.3	Oil, 3.0
12½ parts middlings	Oil, 3.4	Fibre, 2.9
12½ parts pollards	Fibre, 5.0	Carbohydrates, 51.5
15 parts manioc meal	Carbohydrates, 59.5	Starch equivalent, 72.72
10 parts whey paste	Ash, 4.4	
2 parts seaweed salts		
11 part minerals		
½ part cod-liver oil		

Manurial value to the nearest 6*d*., 19*s*. 6*d*. per ton.

No. 3.—For Fattening Pigs.

Composition	Analysis	Digestible nutrients.
44 parts soya bean meal	Moisture, 11.8	Protein, 2.8
45 parts barley	Protein, 12.8	Oil, 10.9
10 parts middlings	Oil, 3.2	Fibre, 2.9
10 parts pollards	Fibre, 5.0	Carbohydrates, 53.0
10 parts manioc meal	Carbohydrates, 61.3	Starch equivalent, 72.2
10 parts whey paste	Ash, 5.9	
2 parts seaweed salts		
1 part minerals		

Manurial value to the nearest 6*d.*, 18*s.* per ton.

Feeding.

The pigs are practically dry-fed throughout, the rations being as follows:

Suckling Sows.—These receive about 112 lb. per week. This varies according to the size of the litter.

Steaming-up Sows.—These receive 42 lb. during the week preceding farrowing.

Dry Sows.—28 lb. a week during the summer, and 35 lb. a week during the winter.

Store Pigs.—25–28 lb. per week.

Fattening Pigs.—45–50 lb. per week.

Labour.

At the permanent depôts one man is employed for every 55 breeding sows, or for every 150–200 fattening pigs. In the fields one man and one horse are employed for every 40 breeding sows, or for every 200 store pigs. All pigs on the estate are ear-marked, and as far as possible complete records are kept from birth onwards.

Historical Survey.

While it is true little was known of swine fever until late in the last century, there is no doubt but that the disease has been in existence from time immemorial. Aristotle not only recognised three different diseases of swine, but even to some extent differentiated between them. The first investigations in this country were carried out by Klein, in 1876, although previous to this a paper was read by Dr. Budd, of Clifton, on "Typhoid Fever of the Pig," in 1865.

Some of the earlier work on swine fever was carried out by Salmon and Smith in America. It was as a result of their work that Salmon issued his reports in 1885 and 1887, in which he contended that swine fever and swine plague were separate diseases. This was followed by a strong attack by Billings, of Nebraska, in which he refuted the arguments put forward by Salmon in his reports "Swine Plague and Hog Cholera," 1887, and "Swine Plague," 1888. While a few workers of that time supported Billings, the majority were in favour of Salmon. It was not until 1904 that it was proved that swine fever (hog cholera) was due to a filterable virus, and that *Bacillus suipestifer* was merely a secondary invader producing lesions in the intestines (Dorset). These conclusions were confirmed within the next two or three years by a number of workers both in Europe and America.

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The Outbreak.

Prior to 1925 the losses in these herds were not greater than might reasonably be expected on an estate where pigs were maintained in large numbers, but with the advent of that year the losses began to increase at an alarming rate. The first deaths took place in pigs from eight to twelve weeks old, and later in pigs up to six months old. It is important at this stage to emphasise the fact that during the whole of the outbreak the disease has been confined almost entirely to pigs up to six months old, and by far the greater number of deaths have occurred in animals between the ages of eight weeks and five months. The mortality among sucking-pigs has been high, but the death-rate among adult animals of both sexes has been negligible. The point that not a single case of necrotic enteritis has been found among the adult stock must be particularly stressed, while keeping in mind the salient fact that a post-mortem examination was made in every case.

In an attempt to preserve the clarity of this paper, it is thought best to deal with the deaths of the pigs from the years 1925–1928 under separate headings, *viz.*, (*a*) suckers ; (*b*) store pigs ; (*c*) adult pigs ; (*d*) all pigs.

(*a*) *Suckers* (1925–1926).—The mortality curve began to rise slightly during September. It rose rapidly during November, reaching its peak at the beginning of January, and then it began to fall steadily until April, when a slight rise was shown. It fell again in May, and the curve remained low throughout the summer. During the years 1926–1927 and 1927–1928 the mortality curves were much the same.

(*b*) *Store Pigs.*—During the period September, 1925, to September, 1926, the mortality curve began to rise in October and continued to rise during the ensuing few months, reaching its peak in March, when it began to fall, and a low level was maintained throughout the summer months.

September, 1926, *to September*, 1927.—The mortality curve started to rise rather earlier than in the preceding year. Deaths began to increase during September and decreased slightly during October, only to rise in November. The curve fell again slightly during December, but with the advent of the New Year rose again and maintained this rise throughout January and February, the highest point being reached in March. With the coming of spring the curve began to fall rapidly, and fell steadily throughout the summer months.

September, 1927, *to September*, 1928.—The increase in casualties started a little later than in the preceding year, the mortality curve beginning to rise in October, and it rose steadily during the next few months, attaining its highest point somewhat earlier than the years 1925–1927, the peak being reached in January. The curve fell rapidly during February and early March, and although a slight rise took place during March and April, the curve, taken broadly, is the same as in previous years ; that is, heavy mortality during the winter months, and a rapid fall in the death-rate during the summer.

(*c*) *Adult Pigs.*—It is with the greatest interest that one studies the mortality curve for adult pigs over the period covered by this paper. The number of deaths

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has been low, and unlike the younger animals, the seasonal factor does not seem to have played so important a part. Losses during the summer months among adult stock have been, for all practical purposes, very little different from those sustained in the winter.

(*d*) *All Pigs.*—The mortality curve for all pigs merely confirms the statements made in the previous paragraphs. A careful scrutiny of the graphs which accompany the paper definitely shows the seasonal incidence of the disease in so far as this outbreak is concerned, and it is this, combined with the time factor, that will exert some influence when conclusions are arrived at.

Symptoms.

Keeping in mind the complicating factors that must arise in dealing with an outbreak of this size, it will be necessary to discuss the symptoms under two headings, based on the age of the animals affected.

(*a*) *Sucking-Pigs.*—The symptoms found in sucking-pigs are extremely important, because they closely resemble those described by McGowan and Crichton, of the Rowett Research Institute, in their papers on " Iron Deficiency in Pigs," published in the *Biochemical Journal*, vol. xvii, No. 2, 1923; and vol. xviii, No. 1, 1924.

It is at about three weeks old that the initial symptoms appear, and one is struck by the pale colour of the pigs. The faint pink tinge that one associates with the skin of the young pig is absent, and because of the paleness of the skin the eyes look unduly prominent. In black pigs the skin has a dull, unthrifty appearance, in spite of the apparent flesh carried. This is particularly noticeable in Berkshires, which when affected have a short, fat, square appearance. Blood counts were not made, but rough hæmoglobin tests made in the field demonstrated that the animals were anæmic.

While the pigs appear to some extent listless, and in many cases their tails hang down straight, they appear to carry flesh and have a stocky appearance until about the fifth week, when they begin to lose flesh. In many cases the ears and other parts of the body become blue.

" Thumps " is a common symptom. Profuse diarrhœa occurs at any time between the third and fifth week after birth. The temperatures of 500 suckers taken night and morning from birth to weaning failed to reveal any rise of temperature. It was hoped when this work was carried out that a temperature reaction might give warning of the impending danger, but the result of this work was negative. The question of " iron deficiency " will be dealt with in the chapter on treatment, when experiments on the feeding of ferric oxide will be discussed.

Although " thumps " has been included as a symptom in sucking-pigs, there is some doubt as to its accuracy, as this phenomenon is more likely to be caused by the larval stage of Ascarids in their passage through the lungs. This point will be dealt with later, under the heading of " Complicating Factors."

(*b*) *Stores and Fattening Pigs.*—Included under this heading are all store

pigs and those in the early fattening stage. Animals that reach the later fattening stages are rarely affected by necrotic enteritis. The only other disease that seriously attacked pigs approaching maturity on this estate was swine erysipelas. The first indication of the onset is that one or more pigs show a disinclination for food. They may come to the trough, but soon give up any attempt at feeding. They stand about with hanging heads and tails down, which gives them a woefully dejected appearance. In the early stages the temperature is elevated, but in animals that survive the acute attack there is little rise in the body temperature. The skin on certain parts of the body changes colour ; this is first noticed on the ears, and later under the arm-pits, belly, and inside the thighs, which turn from blue to purplish-black. The presence of conjunctivitis, with the production of a muco-purulent discharge, and matting of the eye-lids, is never seen in necrotic enteritis.

Constipation may be noticed, but in a large herd of pigs this often passes unobserved, and the first indication of the alimentary tract being affected is profuse diarrhœa accompanied by a most offensive odour. The skin presents an unhealthy appearance, and this may be complicated in the case of pigs kept in the fields by weather conditions ; pigs, particularly white ones, kept in the open during the summer, frequently suffer from sun-burn. It is this condition, aggravated by the animals' rubbing as a result of the irritation, that has caused uninitiated observers to suspect mange.

Provided death does not follow the acute stage, the animals lose flesh, growth is retarded, and there is a general appearance of unthriftiness. Weakness of the hind limbs is present, the hind quarters swaying from side to side when the animal moves. Later the animals lie about, are difficult to get up, and death finally ensues from weakness and exhaustion. Anæmia is almost invariably found in chronic cases.

The majority recover, and it is remarkable how long really bad cases will hang on, provided they are not destroyed. It is the loss of condition and retarded growth which in a bad outbreak are so serious economically and render profitable marketing of such pigs almost impossible. The writer has seen a pen of pigs, following recovery, that at eight months old, although fat, were no larger than pigs three months younger.

Post-Mortem Examinations.

During five years the number of post-morten examinations carried out by the writer on pigs of all ages amounted to 4,200. In the early days of the outbreak these examinations were made at the yards or in the fields where the animals died. While all possible precautions were taken by means of disinfections and careful disposal of the carcases to avoid infection of healthy animals, it was realised that this condition of affairs was unsatisfactory. It was not possible at that time to arrange for the destruction of carcases by burning, and therefore an alternative method was put in train.

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A post-mortem hut was built on some waste land in close proximity to a lime-kiln. A large pit was dug within a few years of the hut, and following examination the carcases were buried in the pit and generously covered with quick-lime. The dead pigs were collected each morning by motor lorry, and disinfection of the lorry was carried out on its return to the garage.

The general method of making the post-mortem examination may be worthy of description. The carcase was placed on its back with the head away from the operator. A deep incision was made in the axillary region, keeping as close as possible to the ribs and cutting down behind the scapula. When this is performed on both sides of the body it causes the limbs to lie flat and helps to maintain the carcase in an upright position. The same operation is performed on the hind limbs, and in addition to keeping the hind legs out of the way the femur readily presents itself if required for laboratory examination should swine erysipelas be suspected.

The next step is to make a long incision commencing at the throat and carried back to the vulva or anus. Anteriorly this incision should expose the sternum, and further back should be sufficiently deep to expose the abdominal contents. In large pigs it facilitates matters if an incision is made behind the ribs from the middle line downwards. This causes a big flap of the abdomen to fall outwards and downwards, giving greater freedom. By next cutting through the cartilages on either side of the sternum this can be turned back, snapped, or sawn off, and the trachea, larynx and œsophagus removed in one piece. The examination of the glands of the throat is carried out at the same time. It is now possible to remove the contents of the thorax and abdominal cavity with the greatest ease. The heart and lungs are then examined, followed by the liver, spleen, kidneys, genital organs and bladder. For obvious reasons the stomach and intestines are examined last.

Keeping in mind the fact that typical post-mortem lesions of necrotic enteritis are for all practical purposes confined to pigs between the ages of eight weeks and six months, the post-mortem examinations made in connection with this outbreak will be considered under three headings: (1) sucking-pigs; (2) stores and fattening pigs; (3) adult animals.

(1) *Sucking-Pigs.*—In unweaned pigs of an early age the post-mortem lesions observed by McGowan and Crichton (*Biochemical Journal*, vol. xvii, No. 2, 1923) are so striking and so closely resemble those found by the writer that they will be reproduced: "The animals were in an apparently fat condition, subcutaneous fat being specially abundant. The heart would be found so dilated as actually to fill almost the entire chest cavity, the lungs being crushed back and collapsed until they were confined in the angle between the bodies of the vertebræ and the ribs. There was great effusion into the pericordial cavity, as also into the pleural cavity, and the lungs were œdematous. There was great effusion of fluid into the peritoneal cavity, and this fluid contained large coagulated flakes. The liver was pale in colour and showed all over the surface and substance minute paler

areas about the size of a millet seed. These areas were in the centre of the lobules. The pancreas was extremely white in colour, resembling a piece of chalk. The kidneys were pale, and the spleen in most cases enlarged."

These findings are practically identical with those of the writer in pigs up to the age of, and including, the fifth week. One did not find, however, that in all cases abundant subcutaneous fat was present ; in fact in a large number of pigs examined this was conspicuously absent. Neither was the presence of pale spots on the liver a constant factor. The spleen was frequently found slightly enlarged. It is in unweaned pigs between the ages of five and nine weeks that one finds remarkable changes in the post-mortem results. At this age a number of young pigs lose flesh rapidly, and the carcases appear emaciated and anæmic. Autopsy reveals that pericarditis is commonly found, and that in many cases pneumonia, pleurisy or pleuro-pneumonia is present. Gastritis, too, is frequent, but by far the most constant lesion is enteritis in all its forms. It may exist as a mild inflammatory condition, or in any stage up to ulceration. In a very large number of animals the bowel wall appears very much thickened, and the lumen is diminished owing to the diphtheritic deposit. This can frequently be wiped off, giving the mucous membrane a furry appearance. In others, long red inflammatory ridges will be found extending down the length of the intestine ; this is most common in the small intestine. While in some cases the glands have been found to be hæmorrhagic, they are commonly hypertrophied and display various degrees of œdema. Petechial hæmorrhages in the various organs are found only in exceptional instances.

(2) *Stores and Fattening Pigs.*—This is the age when necrotic enteritis commonly affects pigs, and the time when post-mortem lesions are most constant and typical, and in consequence the most interesting period. It will be well to remind the reader at this stage that " stores and fattening pigs " include all stores and fattening pigs up to six months old ; pigs over the age of six months are rarely affected. It may appear that this point is unduly stressed, but the fact that the disease is confined within such comparatively narrow limits is of paramount importance to the investigator.

The very great number of post-mortem examinations made by the writer inevitably produced a number of problems, chiefly concerned with associated diseases and parasitic infestation. These had to be examined and dealt with as they arose. While the lesions of necrotic enteritis are confined chiefly to the intestines and associated glands, other organs in the body showed well-defined lesions. Because of the fact that the most important lesions are confined to the intestinal tract, it has been decided to consider them first.

Necrotic enteritis affects both the large and small bowels, and therefore as there is little gained by dealing with them separately, they will be considered together. In acute cases the bowels show a severe inflammatory condition. This inflammation may consist of streaks down the length of the bowel, or the whole bowel may be bright- or dark-red. In animals that have survived the

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acute stage the lesions shown are most varied. In mild cases it may amount to no more than a slightly roughened appearance of the mucous membrane, but in more chronic cases severe necrosis, diphtheresis and ulceration are found.

The deposit on the bowel shows three distinct forms, or stages, with a possible fourth, and are as follows: (*a*) A slightly roughened condition of the mucous membrane. (*b*) A thin greyish-yellow deposit about one-sixteenth of an inch in depth, which cannot be rubbed off; and in this type it has been noticed in a number of cases that the deposit is marked by well-defined sharp ridges. (*c*) A thick greyish-yellow deposit about one-eighth of an inch in depth. This is easily wiped off, leaving the mucous membrane roughened in appearance, very like the appearance described under (*a*). (*d*) A thin black deposit which cannot be rubbed off. This has been described by other writers as being due to the deposition of iron on the mucous membrane.

In pigs showing well-defined lesions of necrotic enteritis, ulceration is present in about 5 per cent. of cases. It is well to bear in mind that although ulceration may be absent in the cæcum, it is unwise to assume for this reason that it does not exist elsewhere. It is often found in other parts of the large bowel, or may be present in the small intestine. The intestines are so thickened in many cases as to be described very aptly by the herdsman as " hose-pipe " gut. Scars are commonly found where resolution has taken place, and these vary from small circular areas to long scars extending as far as 1 to 2½ inches down the length of the bowel.

The Lymphatic Glands.—While changes in the glands throughout the body have been noticed, the glands chiefly affected are the mesenteric glands. While admitting that in a certain number of cases the glands have been hæmorrhagic, it must be emphasised that in necrotic enteritis that is not commonly found. The majority of post-mortem examinations have shown that the mesenteric glands are hypertrophied, may be caseated, or that œdema is present in varying degrees. It is remarkable that, while little or no change can be found in glands in other parts of the body, the mesenteric glands show these lesions in such a large number of cases.

The Stomach.—Gastritis has been revealed in a number of cases examined.

The Liver.—While in some cases fatty degeneration was found, by far the most common lesions are (1) enlargement and congestion; (2) cirrhosis. In chronic cases of necrotic enteritis, cirrhosis is almost invariably present.

The Spleen.—This organ is very often enlarged.

The Kidneys.—The lesions found are important in view of the diagnostic value of petechial hæmorrhages in swine fever. In the vast majority of examinations made little macroscopic change was noticed, but it is true that in a small number petechial hæmorrhages have been found, and it is particularly stressed by the writer that although these hæmorrhages are occasionally found, it must not necessarily be assumed that the virus of swine fever is present.

The Bladder.—It is extremely rare to find lesions in this organ.

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The Larynx.—Macroscopic lesions are rarely found in this organ.

The Heart.—When lesions are found in this organ they are usually associated with other diseases, such as swine erysipelas.

The Lungs.—Pneumonia has been found extensively, commonly affecting the lower lobes, although in some cases a pleuro-pneumonia has been present.

(3) *Adult Pigs.*—The number of deaths in adult animals has been small, and it is rare to find lesions suggestive of necrotic enteritis ; the lesions, when present, have been confined to fattening pigs. It is of the greatest significance that in older pigs autopsy has failed to reveal a single case of diphtheresis, necrosis or ulceration.

Complicating Factors.

Owing to the magnitude and complexity of the subject it is proposed to deal only with the chief complicating factors. The evidence of some of the minor factors is inconclusive ; it is for this reason, and the fact that they will not seriously interfere with the conclusions arrived at, that they will not be examined.

Probably one of the most serious complications was the large number of pigs affected by swine erysipelas. In the early days of the outbreak it is certain that a number of cases were missed, but with the passage of time, and in the light of experience gained, outbreaks were noticed early and treatment given.

During the investigations carried out, swine erysipelas has been seen in all forms, and it has been thought necessary to emphasise the following points, *viz.*, that in the great majority of cases, although discoloration of the skin was present, the classical " red soldier " or " diamond " markings were absent, and that autopsy revealed that death was due to a septicæmia.

The writer is of the opinion that in all cases of sudden death in store pigs where post-mortem examination reveals a septicæmia a long bone should be sent for laboratory examination.

Swine erysipelas has been confirmed in a pig as young as nine weeks old. The more obvious cases have displayed, in considerable numbers, tumefaction, redness and gangrene of the skin. Gangrene has been so extensive that in some cases the skin, from the loins forward, has peeled off, and portions of the ears and tail have been lost. In chronic cases endocarditis has been common, cauliflower-like growths being present on the valves. In a great number of animals affected by chronic erysipelas the joints will be found enlarged and painful, the hock joints being frequently attacked.

The fact that during the outbreak one man was fatally attacked by erysipelas is worthy of attention. He was a man of sixty-five years of age, and was employed as a butcher. The presence of the disease made itself manifest by discoloration and swelling of the forearm, the man finally dying of septicæmia.

Another complicating factor of the very greatest importance was infestation by parasites. Parasitic infestation was heavy, several types of worms being found, but only Ascarids and *Trichuris suis* being found in large numbers. Although

infestation by *T. suis* was considerable, it is doubtful if any serious consequences resulted from the invasion by these worms. It is impossible to estimate with any degree of accuracy the economic loss following infestation by Ascarids in connection with this outbreak, but it is certain that it was considerable.

The problem of parasitic infestation of swine is one of the greatest economic importance to the industry, and it is with regret that the writer views the general apathy in relation to this great problem. Pigs infested by parasites give quite a typical picture and history, which is as follows: The animals appear healthy and active, their appetite is voracious, but they do not show a normal growth-rate, or, if their rate of growth is good, they appear long, flat-sided, hollow animals; later the animals become dull, the skin looks unhealthy, the appetite becomes capricious and digestive disturbances make their appearance. This condition persists in spite of extra feeding. The wandering habits of Ascarids may result in serious consequences, for although, according to Hutyra and Marek, only exceptionally do roundworms get into the stomach, it is the experience of the writer that they are frequently found there, and invasion of the bile ducts has been noted.

While "thumps" in some pigs is undoubtedly due to the larval stage of Ascarids, it is possible that in anæmic sucking-pigs this type of breathing is due to the following causes: (1) the excessive amount of fluid in the thoracic cavity; (2) the enlarged heart commonly found in this condition.

A third factor of considerable significance is anæmia in sucking-pigs. This plays a bigger part than is commonly recognised, particularly in the case of sows kept in up-to-date buildings without free access to yard or fields. Anæmia is due to lack of iron in the milk of the sow, and the most common age is up to six weeks. It is in the early days of life that anæmia is most dangerous, because later the young pigs obtain food other than the milk from the dam. When young pigs have free access to soil or grass by grubbing about, they soon begin to raise the hæmoglobin content of the blood. If young pigs are kept entirely in clean sties with concrete floors their chance of adding iron to the diet is negligible.

Feeding.—During the course of the outbreak the food was changed on many occasions in an attempt to reduce the death-rate: the food was often fed wet. While it is difficult to substantiate, there is no doubt that a number of deaths have been due to dietetic disturbance. Inefficient mixing of certain foods has been the cause of fermentation and decomposition, with sudden death in store pigs as the result.

Overcrowding.—At certain periods, both in the yards and fields, this has taken place, and the argument put forward that this is a common predisposing cause of outbreaks is irrefutable in view of the experiments carried out later by breaking up the herd into small numbers.

Tuberculosis.—This disease has been included, although the number of animals affected was so few that it does not amount to a complicating factor; but owing to its incidence in swine generally it was thought necessary to mention it. The

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pedigree sows and boars were tested by the intradermal method, and following the results of the test applied to the first fifty animals, it was decided to slaughter ten as a check, for at the time of application little information could be obtained as to the accuracy of the method in pigs. The animals slaughtered included reactors and non-reactors. The results of the post-mortem examinations demonstrated the reliability of the test, in so far as these animals were concerned, as only one animal failed to confirm the test. This animal gave a definite reaction, but the post-mortem examination failed to reveal any tuberculous lesions. It is possible that as the autopsy was made in the field, an early lesion may have been missed.

The following reasons are given for the comparative freedom from tuberculosis of these herds: (1) that except in rare cases milk was not fed; (2) the pigs were never put out on pasture grazed by cattle or used for poultry.

Treatment.

The treatment of the associated or complicating diseases will be dealt with first, and in the order in which they appear in this paper, before discussing the methods adopted in connection with necrotic enteritis itself.

Swine Erysipelas.—This was comparatively simple to contend with, although the amount of work involved was considerable. All pigs were inoculated and were dealt with under two heads: (1) pedigree and breeding animals; (2) stores and fattening pigs.

These animals were inoculated at the rate of 500 per week; the serum and vaccine used was manufactured by the Erysipelas Serum Institute, at Prenzlau, Germany. The simultaneous method was used for pedigree and breeding animals, the serum alone being used for pigs destined for market. Small animals were held by an attendant, and inoculated under the armpit; larger animals being driven into a confined space—a dozen or so at a time—the site of injection being behind the ear.

When the work was first carried out the skin was cleansed with iodine or surgical spirit, but later this was dispensed with, the only antiseptic precautions taken being to have a bucket of water containing lysol, and dip the needle in this after each injection.

A separate syringe was used for vaccine and serum. This is of interest because of the great saving of time where large numbers are involved, and the fact that no untoward effects followed this apparently careless method. The losses following the treatment were negligible; the serum appeared to give a sufficiently lasting immunity to enable pigs to be fattened for market, while the simultaneous inoculation by serum and vaccine was entirely satisfactory in pedigree and breeding pigs.

Parasites.—This was one of the greatest difficulties, not so much in procuring the expulsion of the parasites, as the impossibility of finding a satisfactory method of destroying the eggs. It is difficult to know what disinfectant to suggest, because it is believed that none of the coal-tar products or other disinfectants

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destroy the eggs. Water at 80 degrees centigrade will do so; the Americans use lye (potash refuse).

Owing to the high cost of Santonin it was decided to use oil of chenopodium; the administration of this drug was satisfactory both as a vermifuge and from an economic standpoint. It was first given in the form of a capsule, and either vomition occurred or they were improperly administered, for a number of the capsules were found later in the yards, so the method was discarded. The drug was next tried in the food—the pigs being fed individually—and again vomition was the trouble, coupled with the fact that a large number of animals refused to finish the food even after being fasted. The method now in use is to drench the animals, and it is carried out as follows: The animals are fasted for twenty-four hours, the dose given being 15 minims for evey 25 lb. in weight.

A table of doses for use in the field—which the writer continually uses and finds safe and efficient—is as follows:

OIL OF CHENOPODIUM—TABLE OF DOSES.

Age.	Dose.
8 weeks	20 minims
10 ,,	25 ,,
12 ,,	30 ,,
14 ,,	35 ,,
16 ,,	40 ,,
6 months	1 drachm
9 ,,	1½ ,,
12 ,,	2 ,,

For even large pigs it is suggested that the maximum dose should not exceed 2 fluid drachms, although the writer has used 2½ fluid drachms for large sows and 3 drachms for large boars without ill effects.

The drug is added to a full dose of either castor oil or liquid paraffin. More recently the castor oil and liquid paraffin have been discarded, and the dose given in one or two tablespoonfuls of linseed oil. This is followed the next day by a dose of salts given in the food. This method reduces the size of the dose, and as the animals readily take the salts in the food, the contents of the bowels are satisfactorily emptied twenty-four hours later. In cases where it is considered necessary to repeat the dose owing to vomition, a little milk given first will prevent a sensitive stomach reaching, and in others, chloretone, gr. v, may be useful. Large numbers of parasites are passed, and in a fortnight the animals begin to make flesh rapidly, the skin is cleaner and the general condition much improved.

In the case of small pigs, the animal is held between the legs of an attendant, the head is pulled up by gripping the ears, a stick or stout rubber tube is placed in the mouth, and the dose administered with little trouble. Large animals are roped and pulled up to a beam.

The following preventive measures are suggested: Keep the herd in small lots, not more than ten to twelve in a pen. Where permanent farrowing houses are used they should be thoroughly cleansed and disinfected before use. All

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manure and voided worms should be removed to a place where pigs are unlikely to come into contact with it, and so become reinfested.

Treat the sow when she is not in farrow, and she should be washed before farrowing, particularly in the region of the mammary glands. If possible, the sow and litter should be removed within a fortnight to a clean pasture and the litter maintained as a separate unit until four months old. It it during the first four months that the risk of loss is greatest, not only from parasitic infestation, but also from the other diseases common to swine.

This chapter on parasites is largely taken from an article published by the author in THE VETERINARY JOURNAL, June, 1930.

Anæmia.—The symptoms and post-mortem findings in sucking-pigs so closely resembled those found by McGowan and Crichton that blood from pigs on the estate was examined. It must be understood that the tests were made in the field and were somewhat rough-and-ready, but they were sufficiently accurate to show that an anæmic condition was present, probably due to iron deficiency. The examinations were carried further than the sucking-pigs, and it was found that the condition was commonly found also in store pigs. It was decided to feed large doses of ferric oxide to the sows, and about 2,000 animals were treated.

While satisfactory results were achieved up to a point, the reduction of losses was disappointing. This experiment confirmed the work of the Americans, Hart, Elvehjen, Steenbock, Bokstedt and Fargo, published in September, 1929, and it is practically certain that any improvement was due, not to feeding iron directly to the sow, but to the small amount picked up by the young pigs when nibbling at the fæces dropped by the dam or the food in the trough.

Owing to the very large number of animals involved, experiments in feeding sulphate of iron in solution to the young pigs was not undertaken.

Feeding.—The rations were changed on so many occasions in an attempt to combat the outbreak that it is not proposed to go into all the details ; furthermore, the writer does not propose to discuss the relative merits of dry and wet feeding, but merely states that each has its use, and dry feeding undoubtedly results in a great saving of labour. At the same time it will be pointed out that, in the writer's opinion, fattening pigs to be finished off must be wet fed. It gives that additional bloom which is never attained with dry feeding. In the case of sick pigs, wet feeding is essential in almost every case.

Overcrowding.—It is certain that on premises where pigs are stocked in big numbers and overcrowding is practised, outbreaks of any disease common to swine will appear. In the early days of this outbreak pigs were overcrowded both in the yards and in the fields. When the numbers in each yard and field-pen were reduced considerably the losses fell in a direct ratio to the reduction.

Treatment of Necrotic Enteritis.

When the disease was first encountered by the writer treatment was difficult owing to the diversity of opinion as to its cause. While swine fever was suspected, the writer could not subscribe to this opinion, although at that time inexperience

produced a very unsettled state of mind, and it was not until the outbreak had been in existence for some time that the writer took a definite stand in favour of necrotic enteritis due to *B. suipestifer*, and of the absence of the virus of swine fever.

In the sucking-pigs efforts were made to control the diarrhœa, and most of the internal antiseptic and astringent drugs were used. The results in most cases were unsatisfactory, although good results were obtained in a number of cases following the administration of formalin and iron to the dam. The use of these drugs in stores suffering from profuse diarrhœa was followed by excellent results in a number of cases, but at times failed completely. Chalk was fed to all pigs with the idea of supplying calcium, but the results failed to show any well-defined improvement; it is possible that the quality of the bone was improved, but apart from that it did not have any further beneficial effects in so far as this outbreak was concerned.

As swine fever was suspected, it was decided to inoculate with swine-fever serum. Dorset advises the use of the serum-alone method on infected premises, if the virus infection is complicated with bacterial infection—salmonella, pasteurella, erysipelas ("Control of Swine Fever by Immunisation," Dorset, Veterinary Congress, London, 1930). It was decided to adopt this method in connection with this outbreak, and the results showed the serum to be innocuous. This experiment was carried out on 1,400 pigs, 1,000 being inoculated and 400 acting as controls. Inoculated and uninoculated lived together with the following results: Inoculated pigs, 1,000; percentage of deaths, 10; score, 79. Uninoculated pigs, 400; percentage of deaths, 10; score, 77.

It will be advisable to explain what is meant by the "score." The score is an attempt to show the state of perfection attained by the individual, taking 100 as the maximum number of marks given to the perfect pig at the time of disposal. It will be seen from the result that inoculated pigs had a score of 79, while uninoculated had a score of 77. The percentage of deaths was the same in each case.

It will, therefore, be readily seen that there is practically no difference in value between inoculated and uninoculated at the time of disposal; also the important fact that the percentage of deaths was the same in each case. The serum used was American.

Isolation was carried out with the object of checking the spread of the disease. The sick pigs from the pens and yards were called out, and as far as possible removed to yards that were separate units and capable of easy disinfection. Animals whose condition did not warrant retention in the herd were slaughtered, and post-mortem examination invariably confirmed the soundness of this decision. Pigs that have suffered severely are rarely, if ever, worth keeping, as the rate of growth after recovery is so slow that economic marketing is not possible.

In later outbreaks (this article was originally written some few years ago) the writer has used with success vaccine treatment in connection with necrotic enteritis, and the vaccine used has been supplied by Continental manufacturers.

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In coming to a decision as to the advisability of vaccine treatment, the veterinarian must be certain that he is dealing with necrotic enteritis and not true swine fever, otherwise failure will result. As anæmia, if not the precursor, is invariably associated with necrotic enteritis, preventive measures should be adopted to deal with this condition. In herds among which losses occur among the suckers and young stores, the writer makes a rule of always taking rough blood counts, and the results are illuminating.

If sows and young are maintained in movable sties and pens in the open, and these are constantly moved on to clean pasture, the losses from anæmia will cease. In the case of a yard containing a number of young stores that are unthrifty looking, dirty and scabby in the skins, if iron is fed with the ration these animals will be materially changed within a fortnight. The author uses an iron preparation that is extremely cheap, easily fed and invariably effective.

General Considerations.

It is clear that a difficult and at the same time interesting stage has now been reached in connection with this paper. It will be necessary to consider the data at our disposal, and make some attempt to show by its use the contention that the disease under discussion is necrotic enteritis, and that the virus of swine fever is absent.

The outstanding feature of the outbreak is the age at which the animals are affected, and our information shows that the disease is confined to animals under six months, and that the greatest number of deaths takes place between eight weeks and five months. In outbreaks of swine fever due to the presence of the virus, it is acknowledged by the leading authorities that pigs of all ages are susceptible, and it is therefore remarkable that no adult animals on this estate have been attacked.

Graphs demonstrate without doubt the seasonal influence, and a study of them clearly shows that the disease is at its height from November to March, also the time factor is obvious ; that is, if any given period be taken for any year during the outbreak, the severity of the attack is practically the same.

Most writers of authority are agreed that animal inoculation is too slow and costly a method to be of much value for the early diagnosis of swine fever; therefore, as a rapid diagnosis is obviously necessary, it must be based on the symptoms, the length of time the disease has been in existence, the post-mortem findings, the date of entry of fresh animals into the herd, and a history of the premises, *i.e.*, whether swine fever has existed previously.

While the hæmorrhages associated with virus infection were absent and post-mortem examination revealed that in the vast majority of cases the changes in the lymphatic glands were almost invariably confined to the mesenteric glands, petechial hæmorrhages have occasionally been found in the kidneys, and therefore it is the hypertrophy and œdema present in these glands that is of the greatest importance in the diagnosis of necrotic enteritis.

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All forms of intestinal ulceration and diphtheresis have been commonly found in this outbreak, and the writer cannot subscribe to the opinion that this is always caused by secondary invaders following injury to the bowel by the filterable virus.

The secondary invaders are thought by many to be normal inhabitants of the bowel, and innocuous so long as the bowel remains uninjured. Why should it be believed that when ulceration and diphtheresis occur the only cause of injury to the bowel is the virus of swine fever? It seems quite reasonable to suppose that other agents are capable of inflicting damage on the bowel to such an extent that invasion by secondary organisms becomes possible, and the results of this investigation force one to consider such agents as parasites and dietetic errors causing digestive disturbances, followed by irritation of the mucous membrane. These dietetic errors may not necessarily mean that a balanced ration is not fed, but that the quality may be indifferent, and in the case of wet feeding, that the mixing has been unsatisfactory, or too great a quantity prepared and perhaps carried over for some days, with fermentation and decomposition as the result. The possibility of manufacturers changing the composition of a mixture while retaining the same analysis must not be lost sight of—it is done to take advantage of existing markets.

Another frequent cause of serious digestive trouble in recently-purchased pigs is the sudden change when animals are moved from poor premises on to a a farm where a rich heavy diet is fed. While it is admitted that *B. suipestifer* may be a normal inhabitant of the bowel, and in the case of healthy pigs its presence is harmless, the possibility that this organism may become pathogenic at any time when the animal's resistance is lowered cannot be disregarded; from the data given in this paper in connection with the seasonal incidence, it is thought that exposure to bad weather, together with insufficient shelter, may be a factor of considerable importance. It is also certain that in the case of anæmic pigs their resistance to any organism is very much lowered.

Dorset and other workers have suggested that the "serum-alone" method was the most suitable in outbreaks complicated by bacterial infection. This was adopted in connection with this outbreak, and the results obtained were disappointing. As the work done by Dorset and other investigators is of the highest order, the failure of serum inoculation in our case makes only one conclusion possible—that a virus infection was not present.

It may be argued that owing to the low mortality some immunity was developed in the pigs on this estate, or even that the outbreak was due to a low-grade virus: it is not possible to agree with either of these views, because in the case of the former, after the disease had been in existence for at least three years, a number of breeding animals (about thirty-five to forty) purchased in different parts of the country were introduced into the herd, and as no special precautions were taken in connection with them, it is most extraordinary that for all practical purposes no losses took place among them. With regard to the latter, if a low-

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grade virus was present, one would expect that at some period or other the virulence would increase, with severe losses as a result.

It is therefore thought that the disease investigated in this outbreak closely resembles that associated with the so-called " mild swine fever " commonly found in this country, and the diagnosis of which is mainly arrived at as a result of the intestinal lesions found on post-mortem examination. It is the opinion of the writer that if investigations were extensively carried out in connection with these outbreaks of so-called " mild swine fever," it would be clearly shown that necrotic enteritis is being dealt with and that the virus of swine fever is absent.

In the interests of the veterinary profession, and also of the pig industry, it is of the greatest importance that it be fully realised that ulceration in itself is not diagnostic of swine fever.

Conclusions.

(1) Swine fever attacks pigs of all ages. (2) Necrotic enteritis is confined to animals under six months old. (3) Ulceration, *per se*, is not diagnostic of swine fever. (4) The low mortality, the seasonal incidence coupled with the time factor, the experimental work carried out, and the post-mortem examinations made, exclude swine fever and confirm the diagnosis of necrotic enteritis in this outbreak. (5) In outbreaks of necrotic enteritis the use of formalin for the control of diarrhœa in sucking and store pigs is indicated. (6) In attempts to control necrotic enteritis, the breaking up of a herd into small lots is of the utmost importance. (7) It is essential that necrotic enteritis be recognised as a separate disease ; the authorities can then decide whether it shall become a notifiable disease or not, and, if so, under what heading it shall be classified. It is the writer's opinion that by the recognition of necrotic enteritis outbreaks of the so-called " mild swine fever " would cease to exist.

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A FURTHER NOTE ON THE USE OF THE ELECTRO-LETHALER FOR SURGICAL OPERATIONS.

By SIR FREDERICK HOBDAY, F.R.C.V.S.
Professor of Surgery, Royal Veterinary College, London.

IN a previous number of THE VETERINARY JOURNAL, also in the *Veterinary Record*, I have drawn attention to the value of the electro-lethaling instrument as a means of anæsthetising troublesome animals before operating ; one patient being a full-grown Large White brawn with a very nasty adherent scrotal hernia, which took the operator (Mr. Anthony, M.R.C.V.S.) some fourteen minutes to complete. In that instance I commenced with a ten seconds' application of 70 volts electro-lethal current, and then continued it at intervals, as necessary, for five seconds at a time.

In the present instance, a pig, four months old, was sent to the College on the surmise that the animal was an hermaphrodite. It proved, however, to be a male in regard to sex, and after a few moments' search the testicles were removed by Professor Wright from the inguinal canal. There were no after complications, and the pig took the lethal dose without the slightest trouble; and was soon back at its food trough. The instrument used was that invented by Mr. Cyril Golledge, M.R.C.V.S., and acted quite satisfactorily ; being applied three times for five seconds on each occasion during the process of operation.

For awkward animals such as pigs—especially large ones—and for wild animals in zoological collections, where any stitching or other surgical work has to be done, it only means the manipulation of the instrument through (or near) the bars of the cage in such a way that a quick opportunity secures the head ; and, with the current instantaneously turned on, the patient becomes unconscious and able to be handled at will.

Clinical Articles

Rupture of the Stomach in a Horse.

By FRANK CHAMBERS, F.R.C.V.S.
Wolverhampton.

THE subject of this note was a nine-year-old boat horse. One morning (Friday) in October, soon after being fed, he was moving a load of coal from a canal wharf, when he slipped and fell down rather heavily. Someone sat on

his head until the harness could be liberated. After he got to his feet he showed signs of colic. A proprietary colic draught was administered by the owner, and a further dose at 5 p.m. The horse was never in pain until 10 p.m., but he went easier. I was asked to see him on the following Monday, morning as he would not eat. I found him standing quietly, respirations normal, but the pulse much accelerated. The temperature was normal. Whilst watching him I noticed that he made ineffectual efforts to vomit, and the action was more like a choked horse than anything else. To make certain, I passed the stomach tube with care, and when the tube reached the stomach there was a rush of most evil-smelling gas from the free end. One ounce of chloral dissolved in a quart of water was given, and a diagnosis of ruptured stomach made. I saw the horse again at 7 p.m. the same day, and the change in his condition was remarkable. There was great distress, accelerated respiration, and he was practically pulseless. I advised the owner to have the animal destroyed, but he died before the cart could get to the stables.

Post-mortem revealed a complete rupture of the greater curvature of the stomach, five inches in length. The contents of the stomach were scattered throughout the abdomen. As no definite symptom of ruptured stomach appeared until Monday morning, it is possible that the rupture was not complete until that day. Or did the passage of the stomach tube complete the damage? The horse never vomited any stomach contents. If the outer coats were ruptured first, one would have expected the horse to have vomited almost immediately and expelled some of the stomach contents, but after the rupture was complete vomition of the stomach contents could not take place. Also the rush of gas which was noticed when the stomach tube was passed would not have been possible if there had been a complete rupture of the coats. From the post-mortem appearances and the chain of symptoms exhibited, I am inclined to think that the rupture was incomplete until the Monday afternoon, when the very serious symptoms were first noticed.

A Few Quittor Cases Operated Upon During the Great War.

By JAMES TAGG, late Major R.A.V.C.

I VENTURE to hope that it might be interesting to veterinary students of the present day to realise how numerous were the number of " quittor cases " in the Great War. After returning from the front at Ypres in 1914, I was given command of No. 8 Base Hospital, which afterwards became " The Home Counties Veterinary Hospital." During the two years I operated in 552 major operations under chloroform. The minor operations, such as firing, etc., were not recorded, and amongst the 552 cases were 101 quittor cases of fairly long standing and very foul. In many the lateral cartilages were involved and in these the cartilages were excised. The majority of these cases were from batteries, transport and R.A.S.C. It was well-nigh impossible to get them in the early stages. Most of them were from treads. I made it an invariable rule to perform all my operations under

chloroform. I was of opinion that they did better; besides, why should we not set our faces against giving unnecessary suffering to our best friend when we have the necessary remedy to hand? All these cases made good and were returned to Remounts for re-issue, with the exception of one gelding which was cast for other defects. All these cases healed without false quarters. During my long service in India, and some four years in Hungary, Austria and the Balkans, I neither saw a case (chiefly on account of all horses being of lighter breeds) nor had I seen a case operated upon, but the lectures of Professor Macqueen were well expounded to us. I think I am correct in saying it had always been thought necessary in very bad cases to make a window in the hoof to give free exit to pus. I must say I never found this necessary. If you in any way injure the coronary secreting band, a false quarter is invariably the result. Now we notice that pus burrows as a rule in the direction of least resistance, and I noticed that it burrowed below the band in most cases without injuring it, and in cases where it did, one could treat it as an open wound. In operating, one must get well under the botton of the diseased tissue, which at most was not more than, say, two inches deep. I had the benefit of a very good quittor knife made for me by my Farrier Major, with the addition of very good helpers of our own making, and who took as much interest in the well-being of the cases as I myself did. In a veterinary hospital one gets all trades in time of war; and I have the best recollection of a young journeyman butcher with a very good education, whom I taught to be my assistant to hand me my tools, and he anticipated my every want in an operation, which is a great boon, especially when one is tired, as I often was after three or four hours operating daily. I may here add he became a good microscopist, and was excellent in finding sarcoptes and psoroptes in my Mange Hospital. The Mange Hospital was about a quarter of a mile away.

Modus operandi.—Before throwing I used to put on an elastic bandage from the hoof to the knee, so as to press the blood from the cutaneous surface. The patient was then thrown with the addition of cross hobbles, and chloroformed; chloroform averaged 3½ oz. to each case. The chloroform was always administered by one of my officers, as the operator must be fresh and non-fatigued. The tourniquet was now put on, and the elastic bandage taken off. The part around was closely clipped, and well washed with soap and water and disinfected with hydrag. perchlor. The foot was then taken out of the hobble, but the cross hobble kept on. I found a bag of sand for the foot to rest upon an excellent thing, and held down by a reliable assistant, stableman for choice. Over the quittor I made an incision like a T, with the lower part of the T extending to the quittor. I now dissected the skin away from above the quittor. One then cut boldly down and brought out the diseased tissue. If at the base of the diseased tissue there was no normal tissue one must cut down until it is all excised from the base. After well disinfecting in and around the quittor with hydrarg. perchlor., the hole is plugged up with a strong biniodide of mercury ointment, about 1–8. This is well pressed to the base of the hole left, covered up with plugs of medicated tow and bandaged

with strong linen bandages. I often found it necessary to put on two, and sometimes three, bandages. The tourniquet is now loosened a trifle, a few whiffs of nitrate of amyl, and the patient allowed to rise. The case watched for a few hours in case of hæmorrhage, in which case the tourniquet must be tightened a trifle. After a few hours, by repeatedly gradually loosening the tourniquet, it can be taken away. The bandages and the whole dressing to be left on for four days, and when taken off one invariably found granulations had grown up and could be treated as an open wound. These open wounds require to be treated carefully. When the granulations are above the skin line they must be rubbed down carefully with a piece of cupri. sulph., *not powdered on*, as the latter often runs down and causes abrasions of the skin. The dressing I found most useful in these cases was plumb. sub. acet. lotion, fairly strong, about six tablets (as used in the Service) to a pint of water. I found patients very rarely went off their feed, so an extra allowance of oats and bran was indicated.

I would like here to remark that the duties of an O. C. Veterinary Base Hospital are many and onerous. Just realise a hospital with not less than 1,000 horses and mules with every disease that the horse is heir to, with no quarter-master, adjutant or second in command. It is like commanding three cavalry regiments as far as the number of animals is concerned, with the addition of the training of mobile sections, messing and cooking, and tasting the beer in the canteen. To me all of it was a labour of love.

Maiden Lactation in a Heifer.

By A. SHOSHAN, M.R.C.V.S.

Assistant Veterinary Officer, Jaffa, Palestine.

SOME months ago I was informed by a farmer of Ben Shemen, a settlement near Jaffa, that he had a virgin heifer giving milk, although she had never been pregnant. I watched him milking this heifer, and observed that she possessed well-developed mammary glands. The farmer stated that milk yield had increased and was still doing so. Although this phenomenon is met sometimes by veterinary practitioners in cattle practice, I think that this case is a very unusual one and therefore may be of interest to your readers.

The heifer is a Holland-Syrian half-bred, born in July, 1931, the first calf, followed by three other female calves. The dam is a good milker and very fertile. The calf developed normally, and met with no accident. When about a year old she was sucked by her little sister calf. This was stopped as soon as observed. On attaining maturity she came in heat and was served on many occasions by the bull, but without any result. Œstrum occurs regularly. She was served three times in 1933, and five times in 1934, and once this year. Treatment for sterility was adopted, but without any result. Nothing abnormal in the sexual organs could be detected.

Lactation commenced in June, 1934, the milk yield being about seven litres a day, which has steadily increased, so that recently thirteen litres a days, with a butter-fat content of 3.75 per cent. was obtained. Is this a record ?

A Case of Gastro-Enteritis in a Ram.

By J. WILLIS THWAITE, M.Sc., B.V.Sc., M.R.C.V.S., D.V.H.
Liskeard, Cornwall.

THE subject was a Dorset two-tooth ram which for some considerable time had been losing condition, and when seen by me on July 14th, 1934, was in an almost emaciated state. The hindquarters were soiled with fæces and there was a marked œdematous swelling between the rami of the lower jaw. The ram had not been off the farm during the previous twelve months and had been kept on land where there was neither stagnant nor running water.

A sample of fæces was taken from the rectum and examined microscopically. In spite of the fact that no method of concentration was used, the microscopic field was found to be swarming with strongyle eggs. No attempt was made to determine which nematode was causing the condition, neither was an egg count made. Liver fluke eggs were not observed.

One capsule containing 1 c.c. of carbon tetrachloride was administered, followed by a second capsule two weeks later. No other treatment was given. When next I saw the ram, about the end of August, the difference in condition was astonishing. The animal had improved immensely, and examination of the fæces revealed about two strongyle eggs per microscopic field.

This was undoubtedly a severe case of verminous gastro-enteritis, and its effective treatment by carbon tetrachloride indicates once again the usefulness of this drug for this condition.

Dislocation of the Patella in the Dog.

By V. BERWYN JONES, M.R.C.V.S.
Wonersh, Guildford.

IN view of the frequency with which the general practitioner encounters this condition, it would seem remarkable that no operative interference has yet been devised to relieve or cure this disability. A search of veterinary literature brings one to the "brick wall" of "in recurring cases treatment is useless." This hopeless outlook seems to have been accepted and handed down without arousing the slightest interest, even in those who are generally recognised to be our leading canine surgeons. In these days when the breeding and showing of dogs worth considerable sums of money has made any loss of function in the animal a potential financial loss, it would seem to be of some economic importance that we members of the veterinary profession should be able to alleviate, and if possible cure, this condition. To this end an operation was devised,

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and has been successfully carried out, for that type of dislocation which is by far the more common in the canine subject, *viz.*, dislocation over the medial femoral trochlea.

In operations on the canine subject, owing to the ever-present risk of the patient performing unwanted movement or displacing or soiling dressings, it is desirable, when practicable, to avoid open bone or joint operations; and it is well recognised that a very rigid asepsis must be maintained in that branch of surgery. Such completely aseptic operations are difficult for the average practitioner to arrange, partly because of unskilled assistance and often on account of unsuitable premises. Moreover, after such operations on the dog it is often impossible to control the animal sufficiently to carry out passive movements of the joint in order to maintain muscle tone and to avoid arthritic developments. A false movement by the patient before the operation wounds have adequately healed, and the position is not only *in statu quo*, but possibly instead of a disability we have a death.

It is therefore essential that (1) the common femoropatella tibial joint capsule should remain intact, and (2) that the method employed must ensure a sufficiently strong result immediately after operation to withstand some degree of uncontrolled movement, without having recourse to special and often toublesome methods of splinting and restraint.

These cases of chronic dislocations of the patella are usually of the intermittent type: the animal is brought into the surgery, hopping on three legs, but with occasional efforts to fully extend the affected leg. Usually, however, when a full extension is obtained, little or no weight is borne on the limb, and it is rapidly snatched up in full flexion with some degree of internal rotation, remaining in that position for several paces, when the dog will again endeavour to obtain support from the offending limb. Sometimes the patella will remain in its proper place for several days until some especially quick or active movement again displaces it. In other cases the joint becomes locked until the leg is forcibly extended.

A review of the anatomy of the parts shows that laterally the aponeurosis of the patella consists of the fascia lata, together with tendon sheets and insertion fibres from the biceps femoris, rectus, vastus lateralis and sartorius.

The action of all these tissues is to extend the stifle and to abduct the limb. It is especially the tendon of insertion of the so-called quadriceps femoris into the single patella ligament that makes use of this sesamoid, the patella, to strengthen the pull on the head of the tibia and to extend the joint.

Normally in the dog the lips of the femoral trochlea are, unlike our equine subject, of even depth. However, in the smaller patients the trochlea groove is so shallow that once the median lip has been overridden by the patelia and the lateral aponeurosis damaged, the trochlea would seem to be inadequate to exert any restraining influence *per se*, in spite of immediate replacement of the patella.

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There is no doubt that in certain breeds, notably the Yorkshire terrier, the Pomeranian and the Griffon Bruxellois, the condition should be classed as a congenital defect. In these breeds the femoral trochlea is often imperfectly developed and the patella aponeurosis abnormally lax. In other cases, particularly the short-legged breeds such as the Sealyham and Scotch terrier, it would appear that the patella ligament of insertion into the tibial head is out of alignment; the insertion being in line with the median lip of the trochlea. Thus any pull by the biceps would tend to displace the patella medially.

In human surgery a large number of operations for these troublesome cases have been suggested and carried out with varying degrees of success, but it would appear by their very number and diversity that no one is accepted as completely efficient. For example: (1) Albee raises the trochleal lip by inserting a bone wedge into the trochanter; (2) Bennett plicates and strengthens the patella aponeurosis; (3) Soutter drills the patella and tibia, and in effect forms another straight ligament; (4) Wagner resects the tibial attachment of the patella ligament and transplants it to a more favourable position, at the same time rebuilding with a plastic operation the aponeurotic capsule.

In all these either bone or joint cavity is subject to interference, and arguments against such procedures in the dog have already been set forth. In the new operation devised for the canine patient neither bone nor joint cavity is traumatised. The natural pull of muscle acting on an attached living fascial strip is made use of to replace the slipping bone. The principle of this operation, therefore, is to correct any medial displacement of the patella by inserting a living fascial strip from the fascia of the biceps at its junction with the fascia lata into the patella aponeurosis at the lateral side of that bone, in order that voluntary extension of the leg compels an extra pull on the patella in an upward and outward direction. With ordinary care this may be performed without any danger of damaging the synovial capsule of the joint. It is important that every endeavour should be made to obtain healing by primary union, and to this end great care should be taken to employ the full ritual of skin sterilisation. It is the writer's experience that this point of adequate preliminary skin sterilisation is not properly appreciated in the veterinary world.

The Operation.—An incision is made lateral to the patella over the lip of the trochlea, extending upwards along the line of the femur. After retraction of the skin by blunt dissection the subcutaneous tissues are divided and the fascia of the biceps and fascia lata and the patella ligament are exposed. Superficial branches of the lateral circumflex artery can be avoided or clamped. A strong strip of fascia is now dissected from below upward in the direction of the fibres, leaving uncut its attachment at the belly of the muscle. The distal end should be arranged to have been cut from a position as close to the patella as possible, *i.e.*, immediately to the side of the trochlea lip. A tenaculum needle is then thrust through the straight ligament from before to behind, immediately over the centre of the patella, including half the width of the straight ligament and half

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the lateral aponeurosis. The fascial strip is then ligated, and the free end caught with the tenaculum and withdrawn under the aponeurosis and ligament.

After replacing the patella the limb is held slightly flexed and the fascial strip drawn tight and anchored in position. The wound is closed in the usual way. After a dressing has been applied the joint is firmly bandaged in full extension with an elastic plaster bandage, the turns of the bandage being applied from within outwards in order to assist a maintenance of the reduction. It may be an advantage to place the limb in McCunn's modification of a Thomas splint, or the foot strapped forward to a girth and breastpiece. After seven days this is removed and the dog placed in a confined kennel built at eye level to avoid any inducement to jump up and strain the fascial graft. A few days later, if the animal is not of an excitable nature, gentle walking may be encouraged. Normally the bandage can be removed in fourteen days.

Although in chronic cases when the leg is flexed the patella may still override the trochlea, the extra pull of the fascial slip allows the dog to extend the leg, and as extension is performed so the patella is pulled into place on the trochlea. It seems remarkable that no pain or disability accompanies this operation. Some nicety of judgment is required in estimating that the tension given to the dissected fascial strip is only sufficient to effect reposition of the patella in extension. If it is anchored too tightly there will be over-abduction of the joint and loss of the full range of flexion. In all cases some slight degree of over-abduction is evident on flexion. The final result, however, will always be gratifying both to the surgeon and the client, also no doubt to the patient, in that weight-bearing function is restored.

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Reviews

Broncho Charlie. A Saga of the Saddle. The Autobiography of Broncho Charlie Miller, as told to Gladys Shaw Erskine. By GLADYS SHAW ERSKINE. Pp. 291, with 3 Maps and 21 Illustrations. London: George G. Harrap & Co., Ltd., 182, High Holborn. 1935. Price 8*s.* 6*d.*

This book will appeal to all who love horses and horsemen and stirring events and adventures in the wide open spaces of the West. The telling of tales round the camp fire is a time-honoured custom of the Old West, and Broncho Charlie, who, incidentally, came to England with Buffalo Bill, can tell *some* tales. He has found a

willing and gracious recorder and compiler of his narratives in Gladys Shaw Erskine, daughter of the famous pioneer Colonel Richard Shaw; she herself has lived in the saddle from her childhood. The book is very readable and abounding in incident, and Broncho Charlie had a very full life, for " at the age of eleven he was carrying the mail across the plains, dodging Indian arrows, eluding bandits and riding between thirty-five and seventy-five miles every twenty-four hours," and mislaying twenty-three years of his age, he joined up on the outbreak of the Great War, his real age at that time being sixty-nine, and as Sir Douglas Haig said when meeting him, " he must be the oldest man in the Army." He was posted to the 18th Hussars. He engaged in the ruthless extermination of sheep-herders, had various affairs with dance-hall girls and Chinese belles, and was lectured to by President " Teddy " Roosevelt. He came to England with Buffalo Bill's Wild West Show, was presented to Queen Victoria, and took the three daughters of the Prince of Wales for a ride in the Dead-wood coach. After hair-breadth adventures, cow-boy jokes, killings and shootings, breaking-in wild mustangs, and some primeval ways of administering justice and settling disputes, Broncho Charlie gets converted at last and enlists in the Salvation Army. The incident that led up to his conversion is perhaps one of the most humorous in a book that reeks of humour. The illustrations to the volume are very fine, and those of " A Broncho-Buster in Action," " Chief Joseph (Thunder-Rolling-Over-the-Mountain)," " The Frontispiece," and " Theodore Roosevelt," deserve mention.

Dogs : from Pet to Show Bench. By G. and T. Brooke Davison. Pp. 208, Illustrated. Herbert Jenkins, Ltd. Price 3*s*. 6*d*.

Ostensibly written for the amateur, this little book contains a chapter of some 40 pages on common ailments and their treatment, which is only of interest to the veterinary surgeon because it illustrates the kind of " treatment " which is prescribed by amateurs who are unaware of the poisonous actions of drugs whose injudicious use so often leads to disaster; for some of the prescriptions contain drugs which a veterinary surgeon would not dare to administer except under his own close personal supervision. There are a few pages on sick nursing—very amateurish—and some advice on breeding and feeding, which is equally so; and the last 90 pages are spaced out to very microscopically describe some of the different breeds, each description being prominently displayed—almost like one finds in the advertising pages of a show catalogue—with the name and full address of the owner.

Cod-Liver Oil for Stock. Allstock Products, Ltd., London, S.E. Price 1*s*. 6*d*., post free.

Although it is generally admitted that the valuable feeding properties of the above devolve around its potency in vitamins A and D, it has not previously been fully recognised how such vitamins are arrived at, or how, for a buyer and user's guide, they should be enumerated and described by unit value. It is essential that such vitamins should be present in efficacious and economical proportion, and the British Pharmaceutical Society have set a standard that an oil containing less than 80 International units per gramme of vitamin D is quite unsuitable for stock feeding. Further to the above is the fact that the oil should be appetising—that is, sweet-smelling and tasting—and all this and other most valuable information upon the manufacturing, past and present, processing, testing and marketing of oil for farm use, is very interestingly and informatively described in a brochure recently published by the above commercial house under the title of "British Cod-Liver Oil—Veterinary and Medicinal."

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In this work the reader is taken in a very unique manner through phases of cod-liver-oil production from the time the fish are caught to the time the user has to make his choice of the oil for his stock. The modern methods of steam processing aboard ship are usefully explained, and, in contradistinction, the older and still practised shore factory processing of stored livers also. The writer states that the former method results in a natural light-golden oil of sweet smell and taste and extremely low acidity, whilst the latter accounts invariably for some of the darker, strong-smelling and -tasting oil to be found in circulation for farm use. This quality is usually associated with high acidity content, a feature that is very undesirable, especially where young stock are concerned. Most valuable are the parts dealing with this; also most important is the non-technical explanation of the methods available for the testing of vitamins A and D and their expression in terms of International units per gramme, to the exclusion of all other obsolete terms for unit values.

There is a table of recommended dosages for various animals, and some twenty art-plate illustrations of various operations connected with the industry, making the publication throughout a very useful guide and work of reference upon what to look for, what to ask for, and what to avoid, when choosing oil for stock purposes. Although, as will be seen, this book is published at 1*s.* 6*d.*, post free, we understand from the Company concerned that a limited number of copies are available to our contributors gratis, if mention be made of this Journal, and we can well recommend our readers to obtain a copy and give it a place upon their bookshelves.

Correspondence

THE UNIVERSITY OF LONDON ANIMAL WELFARE SOCIETY.

To the Editor of THE VETERINARY JOURNAL.

SIR,—Readers who sympathise with the Gin Traps (Prohibition) Bill, which was defeated in the House of Lords on May 28th by a narrow majority, will wish to know what this Society, as responsible for the promotion of the Bill, intends to do next.

Our case consisted of facts carefully documented with evidence, and we welcomed and fought for the proposal to have the Bill referred to a Select Committee which would test those facts judicially. This was really the question at issue when the House divided on the motion for rejection of the second reading, and it was to prevent such a judicial examination that our opponents fought so heatedly.

Since facts tend to prevail eventually over prejudice, we shall continue to make them known and shall seek a favourable opportunity for further Parliamentary action.

May we express our deep gratitude to THE VETERINARY JOURNAL, to the Peers who strove for the reference to a Select Committee, and to the humane societies, Local Authorities, Chambers of Commerce, farmers, sportsmen and many others whose support has brought such an encouraging result to the first round of our contest. Pending abolition of the trap, a very great diminution of cruelty can be effected by popularising humane means (not "humane *rabbit traps*") for dealing with rabbits and rats. We strongly recommend the use of cyanide fumigation, and shall be pleased to send Capt. W. H. Buckley's report on this subject on receipt of a stamped foolscap envelope.—I am, Sir, yours faithfully,

FREDERICK HOBDAY, *President.*
University of London
Animal Welfare Society.

68, Torrington Square, London, W.C.1.
June 17th, 1935.

News

COUNCIL OF JUSTICE TO ANIMALS AND HUMANE SLAUGHTER ASSOCIATION.

Some of the Work Carried Out during the First Five Months of this Year (1935).

Humane Slaughter.—Members of our headquarters staff have interviewed officials and councillors of the following local authorities in order to appeal to them to include sheep and, where necessary, pigs, in the Slaughter of Animals Act by means of either a resolution or bye-law : Gipping, Deben, Cosford, Theawastre, Newmarket, Loddon and Clavering, East and West Flegg, Mitford and Launditch, Leiston, Thingoe, Melford and Clare Rural District Councils ; Stowmarket and Bungay Urban District Councils. Eleven of these Councils have agreed to our request, three appeals are down for discussion during the next few weeks, and one has refused to protect sheep.

Walsingham Rural District Council.—This Council, which turned down our appeal last autumn, has, we are glad to say, re-considered the subject and brought sheep within the scope of the Slaughter of Animals Act.

Corporation of London.—Official records show that during 1934 no less than 99,859 sheep were killed in the Islington Slaughter-house. Our appeal for the humane killing of sheep was granted in March of last year.

Breach of Slaughter of Animals Act.—During a recent campaign our representatives discovered several serious breaches of the Act, *i.e.*, sheep and pigs were being slaughtered without previous stunning in districts where the local authority had contracted sheep into the Act, and where electric current was available in the slaughter-houses for the stunning of pigs. We took the matter up with the local authorities concerned, and the methods of inspection have been tightened up. We are requesting local Councils to see that the Act is administered, and, in addition, are doing as much investigation work as we possibly can.

Cattle Markets.—The following cattle markets have been inspected : Bury St. Edmunds, Ipswich, Norwich, King's Lynn, Pakenham, Yarmouth, Stowmarket, Colchester, Carlisle, Penrith, Cockermouth, Newmarket, Acle, Diss and Cardiff. The market authorities were interviewed, and practical suggestions that will prevent much suffering were made. In markets where our suggestions have been carried out, shelter, better arrangements for handling the animals, together with more freedom of movement, have been given to thousands of cattle, calves, sheep, lambs and pigs. These improvements minimise much of the rough handling and misery the animals undergo. The owners of one of the larger markets have decided to spend £2,000 to cover the cost of structural improvements and additions. When completed, the alterations will bring relief to many thousands of animals yearly. Last year we obtained a promise from the managing-director of a large northern market to build an inner sale ring inside the large sale ring, and to exclude buyers and the public. This has now been done, and we have had the pleasure of seeing it in operation. This alteration speeds up the sales and prevents a great deal of beating and tail twisting.

Animal Transport.—Our negotiations with the various authorities dealing with the transport of imported cattle arriving at the port of Glasgow are nearing completion, and we have reason to believe that the building of loading banks and railway

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sidings will be commenced this summer. These arrangements will put an end to the driving of thousands of animals through the streets from the docks to the markets, a distance of four miles.

Transit of Animals Order.—This order regulates the construction and the unloading equipment of commercial vehicles used for carrying animals from farms to markets and slaughter-houses, and compels the use of side rails during loading and unloading in order to prevent injury from falling. We have found a number of cases of breach of this order, and have taken these up with the police and local officials, with the result that the inspection in these areas has been considerably tightened up.

DISEASES OF ANIMALS BILL.

The Diseases of Animals Bill, which passed the House of Lords on May 30th, was read a first time by the House of Commons on May 31st. On May 30th, the Lords inserted an amendment authorising the Minister of Agriculture to make Orders relating to the importation of therapeutic substances.

SCOTTISH QUESTIONS—GLASGOW VETERINARY COLLEGE.

Mr. Maxton (Bridgeton—I.L.P.) asked the Secretary of State for Scotland whether, having regard to the work done by the Glasgow Veterinary College, he would place it on the same footing as the Edinburgh College as regards Government grants.

Sir Godfrey Collins.—State grants were formerly given to the Glasgow Veterinary College, but as there did not appear to be a need for two State-aided veterinary colleges in Scotland, it was decided in 1923 to discontinue the grant to this College. The decision was subsequently supported by the majority of the departmental committee appointed in 1924 to consider and advise regarding the general organisation and finance of agricultural education and research in Scotland. I see no reason for departure from the decision then arrived at.

Mr. Maxton.—Is the Minister aware that these decisions were taken twelve years ago, and that the Glasgow College still continues with practically the same number of students as the Edinburgh College ? Does he not think steps might be taken to put both on the same footing ?

Sir Godfrey Collins.—The circumstances which caused the decisions to be taken in 1924 still remain, so far as I understand, and I do not think there is any necessity for having two State veterinary colleges in Scotland at the present moment.

Personal

THE Austrian Institute for the Study of Animal Diseases at Mödling, near Vienna, this week celebrated the twenty-fifth anniversary of its foundation. In the last few years the Institute has been called on to pronounce on the cause of death of domestic animals in 50,000 cases on the average each year.

To Mr. Hugh Begg, veterinary inspector for the County of Lanarkshire, who retires next week after twenty-five years' service, belongs the honour of being the first full-time Veterinary Inspector appointed in Great Britain.

THE DENVER CHEMICAL MANUFACTURING CO. announce that their new address is Carlisle Road, London, N.W.9.

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